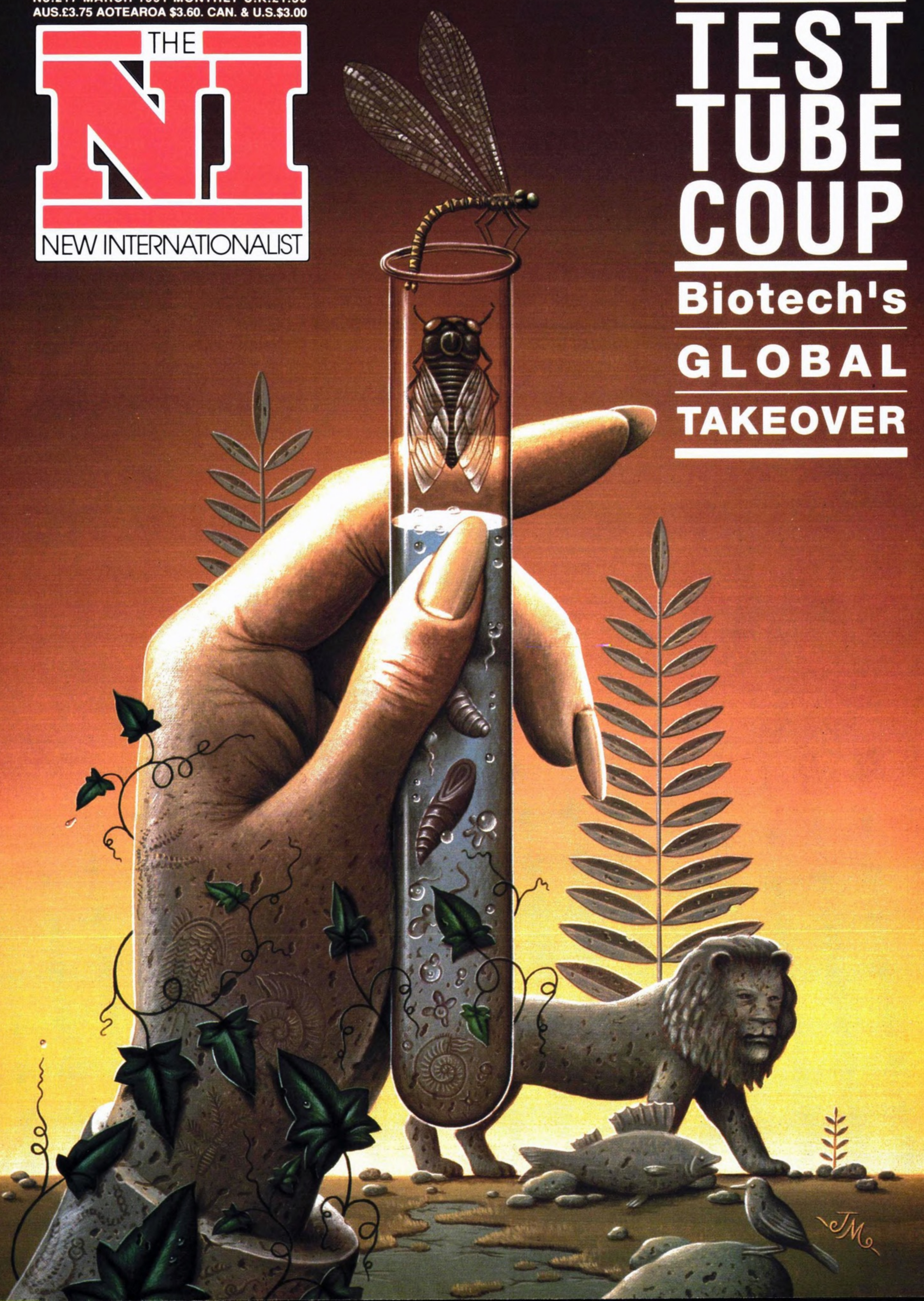


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New Internationalist exists to report on the issues of world poverty and inequality; to focus attention on the unjust relationship between the powerful and powerless in both rich and poor nations; to debate and campaign for the radical changes necessary within and between those nations if the basic material and spiritual needs of all are to be met; and to bring to life the people, the ideas and the action in the fight for world development.

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'BUT wait,' I said desperately interrupting the scientist who was explaining in mind-boggling detail the techniques by which scientists can alter an animal and its offspring forever, 'I don't want to do it. I just want to know whether **NI** should be for it or against it.'

There was a pause. 'I don't know', she said.

'You see,' I persisted, 'I have to decide.'

'Why?' she asked, 'Can't you just give your readers the facts and let them make up their own minds?'

That is certainly the route many writers have taken judging by the number of books with inquiring titles like: *The Bio Revolution: Cornucopia or Pandora's Box?*, *Genetic Engineering - Catastrophe or Utopia?*, *Miracle or Menace?*

Biotechnology and the Third World.

If I had done the same, I would have saved myself a lot of trouble - and sleepless nights wrestling with the sort of issues that in the past we saved up for theologians and philosophers. Or which we didn't consider at all because they never arose.

But at **NI** we figure you get enough questions from other sources, and what you need from us is a few answers. You don't have to accept them of course: you only have to read our *Letters* page to see that many readers do take issue with the things we write. But at least we give you something to chew on, something with which to argue and extend the debate. So I ploughed on.

And in the end I did come up with some answers. What's more, it was heartening to discover the number of scientists who are also trying to tackle the political and ethical questions thrown up by biotechnology. Some aren't. But some are. And that is enormous cause for hope. My thanks especially to Dave King of The Genetics Forum for his advice and support

in preparing this issue.

Just as the magazine started to come together, war broke out. The latter stages of producing this issue have been punctuated by television reports, demonstrations, peace-group meetings, anxiety, and more hair-raising news. As if to highlight the potential that science has to be abused, we have heard Saddam Hussein threaten to drop chemical and biological weapons, and seen high-flying Western aircraft devastating Iraq with bombs.

These terrible developments offered one more proof, had I needed it, of how urgently we have to address what is happening in biotechnology. Because developments in this field are threatening to run away with us. And unless we pull them back, they could plunge us all into deep trouble.

Sue Shaw
for the New Internationalist Co-operative

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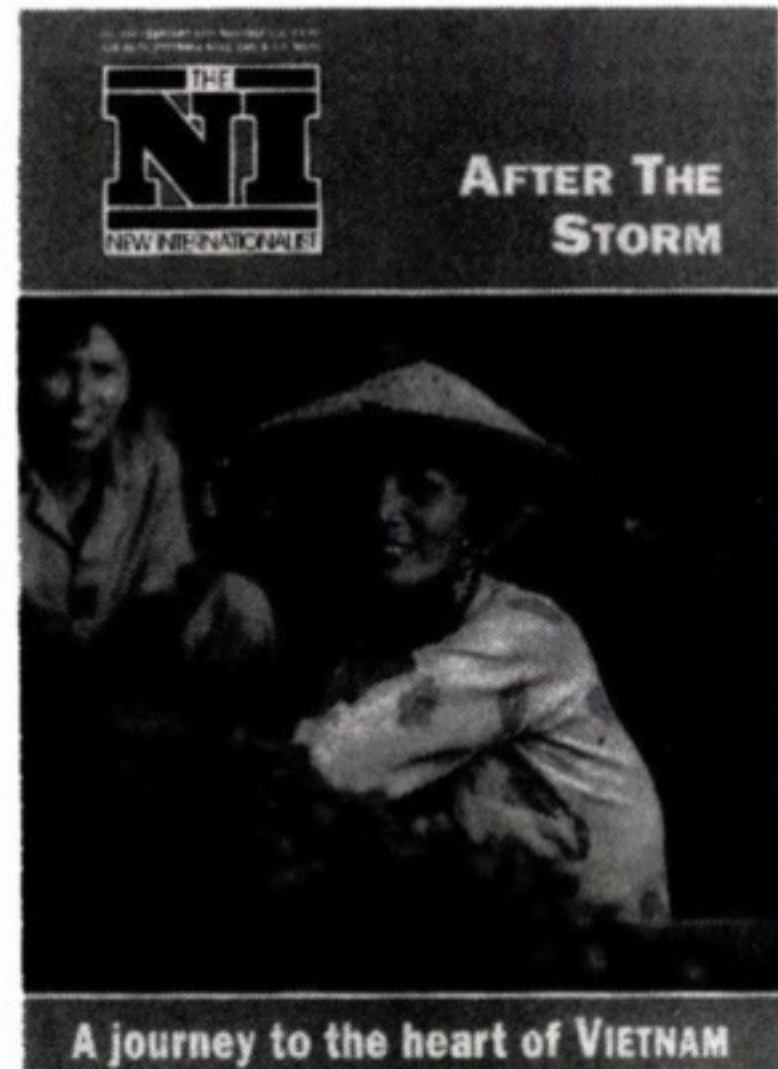
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Gulf commentary

It's ironic that your issue on Vietnam (*After the Storm*, NI 216) should have arrived on my doorstep at a moment when all other media are concentrating on the effects of a rather more recent US-led



conflict. As it was I couldn't help reading the magazine as an indirect commentary on the Gulf War, documenting as it did the damage done to a country by the US in its role as global chief of police.

The US (with Britain always poodling along behind) seems incapable of seeing that violence begets violence. Just as economic sanctions would have been the sane way to tackle Iraq your issue makes clear that an economic blockade has been infinitely more effective than warfare in winning Vietnam away from hard-line Stalinism. And if they'd offered aid to Ho Chi Minh instead of the French colonists after the Second World War, the Stalinism would never have arisen in the first place.

Geoff Winterburn
Durham, UK

Human guinea pigs

It was good, if harrowing for me, to read the accounts of animal torture (*Animal rights and wrongs* NI 215). But it is a shame that natural medicines which have not been tested on animals were not more strongly promoted in this magazine. The link between drug companies and animal laboratories can be broken if people become aware of the availability of

NI welcomes your letters. But please keep them short. They may be edited for purposes of space or clarity. Include a home telephone number if possible and send your letters to the nearest editorial office. The address is inside the front cover.

safe and effective alternative therapies, such as homeopathy which is tested only on human beings. Healing ourselves with natural medicines will help heal our cruelty towards animals.

Helen Whalley
Didsbury, UK

Vegan rumbles

How could you run a feature on animal rights (NI 215) and not include something about veganism? There can be no excuse: until May 1990, the UK Vegan Society headquarters was only a two minute walk from the NI office! Admittedly your two animal rights raiders described themselves as vegan but that's as far your coverage went.

Veganism is a life-style which seeks to exclude all forms of exploitation of animals — be it for food, clothes or any purpose. In dietary terms, it involves dispensing with *all* animal produce — including meat, fish, poultry, eggs, non-human animal milks, honey and their derivatives.

Richard Farhall
(General Secretary of The Vegan Society)
Oxford, UK

Hate male

Christine Schaffer misses the point (*Letters* NI 215). I too have close male relatives — two brothers, two sons, a father and a husband — and I know they don't hate me as

an individual any more than I hate them. But generally speaking men do hate women. How else could they create a patriarchal society with sexual and racial exploitation instead of developing a world where caring feminine values are more in evidence?

Denise Conlin
Southampton, UK

Brutal dilemma

I disagree with George Lewis (*Letters* NI 215) that men are brutalized by their social role while women are protected from the harsh things of life. Many women try to share their innermost thoughts and feelings with men who are often unable to reciprocate and switch off rather than make themselves vulnerable (in male terms) by exposing their less masculine qualities. I believe our socialization process is at fault and it is up to men as well as women to challenge the system which forces us all into lonely roles. Instead of castigating women George might consider joining a men's group and encourage other men to do something positive.

SM Scott
Tynemouth, UK

Wake up, George

I do not know which privileged, protected women George Lewis refers to unless he means those attached to wealthy white males, that is

those men who seek to dominate and control the rest of us for their own profit. Surely George doesn't really think women are unaffected by war? Bombs and nuclear fallout take no account of gender.

Indeed women have also taken an active part in conflict and continue to do so in Palestine, Africa and South America. On the domestic front they also face childbirth, domestic drudgery, rape, wife-battering and poverty. Often they raise families alone. Protected? Come on George, wake up.

Patricia Brunner
London, UK

Cutting words

Celia Kitzinger's letter (*Letters* NI 215) attacking episiotomy operations made me see red. As a female doctor training in obstetrics and gynaecology, I would like to know the significance of episiotomy being the only operation not done with a scalpel? How else do you cut through a distended perineum without incising the baby's head? Of course a first degree tear heals better than episiotomy as Kitzinger points out. But I have seen normal labours without episiotomy where the whole back wall of the vagina has practically gone. It is not acceptable to let women bleed to death, somehow the mother has to be stitched up. That may well be tight as a virgin but not through choice. Having babies can mutilate women's bodies. But to blame medical practice for that is illogical.

Dr Emma Gorton
Merseyside, UK

Doctor's defence

Celia Kitzinger (*Why men hate women* NI 212) makes hostile and unfair references to modern obstetric medicine. As a medical student doing a rotation in this field, I understand that the clumsy doctor must warm the instruments before inserting them into the vagina. Manual and instrumental examinations are minimised if there is a risk of infection. Callous doctors are not only found in obstetrics; callous people are not always doctors, and callousness is



becoming visible as a female trait as women follow careers previously reserved for men.

Juan C Chirgwin
(address withheld)

Condom concern

I found your review of the Karate kids (*Reviews NI 214*) rather disturbing in its implication that the sexual abuse of children is justifiable if a condom is used to minimize the risk of AIDS. I consider that this message is totally unacceptable. If the villain in the cartoon offered to use a condom, would he be transformed into a hero? Surely not.

Gavin Wynch
Liverpool, UK

Catch 22

Amorey Gethin (*Endpiece NI 214*) says that 'language ... puts unclean bonds on

thought even before the thought has got freely going'. This anti-language thesis might be a little less unconvincing if Mr Gethin could present it without relying on language himself. When he tells us that language is a distorting, false mirror, presumably he means he has a better mirror to offer: a medium in which thought can get freely going without language's unclean bonds. Why doesn't he tell us — non-linguistically of course — what it is?

TDJ Chappell
Edinburgh, Scotland

Take it easy, Mac

'Macintosh computers are called after a popular American apple,' you stated at the end of your article 'Electronic sweatshop' (*The secret life of the apple NI*

212). It ain't so. The Macintosh is a Canadian apple. When John Macintosh, a United Empire Loyalist, fled to Canada in 1797, he settled on a farm in Upper Canada (now Ontario) and there found 20 apple trees that bore extraordinary fruit. From these few came the apples that bear his name and are now a popular variety throughout North America. *New Internationalist* is good, but a bit of nationalism is in order occasionally.

RH Farquharson
Toronto, Canada

Fundamentally afraid

It was interesting being on the receiving end of your opinions and prejudice in the issue on *Fundamentalism (NI 210)* Until now I thought of myself as a normal, free-

thinking, caring, intelligent Christian person. My mistake it seems, was to personally experience the love and fellowship of God the Father and Christ his Son, and worst of all, the power of the Holy Spirit. I should have known that it was only a figment of my psychological insecurity, as it is with the other 1,230 million people who are also Christians. But I mustn't joke, because Christians don't have fun — that's their biggest problem. Do you have something against balanced reporting? Or are you afraid of finding a truth that you can't handle?

Bruce Fulford
Wellington, Aotearoa (NZ)



The views expressed on the letters pages are not necessarily those of the NI.

LETTER FROM TAMIL NADU



My sympathy for Saddam

President Bush and the allied forces in the Gulf War claim to represent the world. Yet many people in the Third World resent the US

more than Saddam Hussein. Mari Marcel Thekaekara offers a view from the Indian hills.

JANUARY 17 1990. Today the bombs fell on Baghdad. It wasn't a surprise really but we were all stunned just the same. Everyone expected deep down inside that somehow sanity would prevail even at the eleventh hour. After all, hadn't we arrived at 1991 in spite of everything?

The BBC interviewed a Western journalist who echoed the sentiments of many Indians. Sure Saddam Hussein needed to be kicked in the pants. But who the hell was Bush to do it? Bunched around a radio, we listened to Bush's monotone on why Kuwait 'had' to be liberated. America's duty to 'mankind'. 'The sheer hypocrisy makes me want to throw up!' I yelled in disbelief and disgust.

'You're surprised?' a friend asked. 'Americans are the most hypocritical race on God's earth, you know.' 'They're not the only ones though,' someone else put in. 'All politicians are the same. The Americans are more powerful and can do these things but probably if Saddam Hussein or Gaddafi had the power that Bush has they'd be ten times worse.'

I thought about that a lot. And about my irrational sympathy for Saddam Hussein. Nobody could support his takeover of Kuwait. Nor his evil genius in continuing to kill his compatriots in an eight-year war with Iran. Still, the image that emerges in these parts is of a plucky little guy (albeit a madman) standing up to Uncle Sam's might. And everyone wishes him luck. There were jokes all around about Uncle Sam being Saddamized. And there's unsuppressed glee at the thought. It was the same with Gaddafi. Though the stories about him made your insides churn, when Rambo struck there was the same wave of irrational sympathy.

This sympathy has nothing to do with Saddam's being an Arab. Asians by and large do not love their Arab employers. This is probably due to the fact that in spite of the lucrative (by Asian standards) wages earned in the Gulf there is rampant exploitation of Asian labour — as a workforce they are treated like dirt, as worse than second-class citi-

zens. There is an atmosphere almost of apartheid where white professionals doing the same jobs as Asians are paid three to four times as much — the rationale being that whites are used to a higher standard of living in their countries.

So Asians don't adore Arabs — and anyway there are Arabs on both sides of this war. But there's an all-pervasive anger at the high-handedness of powerful countries which makes people glad that there are Saddam Husseins and Gaddafys to try and put up a fight.

Although people equate arrogance with power the Soviets and Chinese get away with their Lithuanias and Tibets largely because no one expects any better of them. This is ironically due to the Western world's highly successful campaign against Communism. The Americans succeeded like no-one else in telling the world that the Russians and Chinese were the bad guys and you don't expect bad guys to reform. So when they attack Lithuania or Tibet, people shrug their shoulders in disgust but don't really expect anything else.

But the question remains: how come the Americans didn't bomb Russia or China or Israel? Good guys just have to be right. Fair play. Justice. Democracy. Aren't these American catchwords after all?

The more important word in the end, it seems, is oil. Something which has always amazed me is the blatant about-face which the Western media produced when Arab countries struck oil. When I was a child deserts were all about Arabian nights, Lawrence of Arabia, wonderful, exciting, adventurous places. As a teenager I remember reading good old Mills and Boons where there were dashing Arabs in flowing robes, exciting souks, the smells of spices, oases, snow-white English virgins rescued by sunburnt Arabs (who had to be half-English to civilize them but it was the barbaric half which made them exciting).

Then came the oil boom. Arabs hit the headlines. Harrods and the Dorchester were bought up. Nowhere was sacrosanct any more: the Arabs had arrived. Suddenly the dashing Bedouins turned into filthy lechers, corrupters of young boys, ravishers of innocent blondes.

Okay, I too have seen decadent Arabs in the Kuwait Hilton and Dubai Sheraton with beautiful blondes slobbering all over them for a price. And I've thought them dirty beasts. But that just leaves me confused. Hasn't there been another Western media switch? Aren't these oil-richest of all Arabs the self-same plucky little Kuwaitis the US is now so eager to defend? Is it for this handful of people that Bush has bombed Baghdad? He should at least know that the worldwide consensus he claims to represent does not extend to this corner of India.

God help the parents who will weep for their children.

Mari Marcel Thekaekara has been working for the last seven years on a project she and her husband started for native people in the south Indian state of Tamil Nadu.

Scientists can put the genes of an elephant into a daisy. But should they? Sue Shaw answers the vital question.

TEST TUBE COUP

Biotech's GLOBAL TAKEOVER

LISTEN. Yes, you. I'm talking to you. I'm saying that they do exist: blue roses, luminous tobacco, soybeans containing genes from a fish.' These are not dreams, no idle fantasies of some science fiction writer. They are real. They were developed through a new science called biotechnology which threatens to transform our world into a nightmare unless we control it.

Human beings can now manipulate at will the inherited characteristics of any living thing and its future generations. Already scientists have transferred animal genes into plants, and human genes into animals. The genetic boundaries that separate species have been breached.

Strange changes

I tell you, they are doing bizarre things. They have put rat genes into mice to make them 'supermice'; put human growth hormone into pigs to make them large; made chicken taste like beef. Some have even created a mouse predisposed to cancer.

Ask 'Why?' But shout it loud or nobody will hear you. Your voice will vanish on the winds of change, for developments in this science are storming along faster than you and I can say 'What for?'

Of course biotechnology could help solve hunger, pollution and other things



besides. It might cure horrible diseases like cystic fibrosis. Or even find a vaccine for AIDS. It has already, for example, produced human insulin and a vaccine against Hepatitis B.

But as to the ethics of altering life-forms? That's another matter. You see biotechnology can tell humans how to do many things. But it cannot say what is right or wrong. The motives of scientists

and companies do not give audience to the voice which demands: 'What right have you to alter the essence of a creature – as if its only purpose on this earth were to serve human ends?' When they discover a fraction of what there is to know, they think they understand it all. And they don't think through the consequences of applying their fraction of knowledge.

History offers precious little comfort when it comes to the science of genetics. Take criminal behaviour. 'It's in the blood', you hear people say, meaning criminals are born not made. Public opinion applauded loudly when scientists discovered an extra sex chromosome in some male criminals. Conclusion? All men so constructed are destined for a life of crime. This curious and mistaken logic had its consequences in the 1970s.

Maternity hospitals in the US, Canada, Denmark and the UK started screening new-born babies for the trait. The crime and chromosome connection was still unproven. There was no cure. What were parents supposed to do with this information? What self-fulfilling prophecy results from labelling a child delinquent at birth?

Of course some tests can usefully diagnose disorders in fetuses thus enabling early treatment. But there are many ethical and political dilemmas that

arise from placing value-judgments on genes.

After all, who decides what traits are good or bad? Or which sections of the population should be screened? Or even which tests are sufficiently reliable to be used? Predicting the future of a person from their genes is often like telling fortunes from a crystal ball: in some cases no-one knows if a trait will manifest itself. And anyway diagnoses far exceed cures.

Yet the screening phenomenon is growing. Employers, insurance companies and others are using this medical facility as a discriminatory tool. The US Air Force Academy excluded black people from its flight school for 10 years, on the grounds that they might develop sickle-cell anaemia.² But not every black person bears the gene for this disease, and not everyone with the gene falls ill.³

Each one of us is unique genetically. But placing values on our genes can result in seeing differences as 'flaws'. And who knows how big companies or ruthless politicians might interpret and mis-use the genetic data that companies are gathering and storing on computers?

Neutrality myth

Now these fears may sound rather far-fetched, melodramatic even. I certainly thought so until I spoke to plant virologist Dr Roger Hull at an International Plant Science Research Institute in the UK. He helped me understand the mechanisms that drive biotechnology by bringing me face to face with the myth of 'neutral science'.

Consider the question of who decides which areas scientists will research at institutes such as the one where Dr Hull works? The answer is: those who pay the piper call the tune. The research agenda is ultimately set by the agencies that fund it. Broadly speaking they decide which goals will be met. And they are not under any democratic controls.

Scientists at Dr Hull's institute are



Spiked milk: nothing on the carton to say if the milk contains the artificial hormone BST.

researching many things from how to make the humble pea produce soybean oil, to the molecular biology of viruses that attack rice. How could such work be used?

'You must stop asking me that,' said Dr Hull. 'My job is to increase basic knowledge, to adapt existing concepts and create new ones [about the way viruses attack plants]. What we produce might be exploited, but that is not our remit. We are not here to make value judgements.'

This is the classic justification that scientists use for not thinking about the consequences of their work. 'If it's misused by society,' they say, 'it's not our fault.'

But there are many ethical considerations in the kind of work being carried out at this institute. For knowledge produced here could be used in many ways. Take the project to produce soybean oil from peas. This development might release the West from its dependence on some veg-

etable oil imports. And that could bankrupt Third World farmers whose livelihood ultimately depends on such sales.⁴

Or consider the rice project on which Dr Hull works. Hopefully it will eventually result in a pest-resistant rice – a life-line for hungry people. But theoretically data on viruses could also help create a biological weapon which would destroy Third World rice crops. Scientists have little control over how their work is used once it is published. And some don't care.

Rich pickings

Big companies are among those funding work at Dr Hull's institute. They look at the scientists' research and when they see something they can develop and sell, they patent it, to make users pay for the 'invention' and stop competitors from copying the idea. You see, biotechnology is propelled by the same motor that drives any other business – the quest for profit. The difference is that the technology is powerful enough to transform life itself. And because many companies are indifferent to ethical and environmental considerations, unless controlled, their projects might cause serious harm.

Already companies are pressing to be allowed to 'set the conditions of sale' over every life-form they claim to have invented. This is no joke. If they succeed, they will have absolute control over whatever they create.

Giving them monopolies is like saying: 'Go ahead. Change life as you will and sell it for as much as you can.' As if we owned life to give away. Or had neither the right – nor the responsibility – to choose how biotech affects our world.

Even now scientists and companies are releasing into the environment engineered microbes, like those designed to digest oil slicks, detoxify waste and the like. Such bugs are safe, they say.

GLOSSARY

Amino acids: The building blocks of proteins. The thousands of different proteins are made up of 20 different amino acids which comprise living organisms.

Bacteria: Simple one-cell organisms.

Base: The 'building blocks' that make up nucleic acid (either RNA or DNA).

Cell: The basic structural unit of all living organisms which is bounded by a thin membrane.

Chromosomes: Structures composed of DNA and protein which transmit genetic information and are found in the nucleus of the cell.

Deoxyribonucleic acid (DNA): The molecule which sends out coded information which enables cells to function and reproduce themselves. DNA can also replicate itself.

Gene: A section of a nucleic acid molecule which has the complete code for a single protein.

Genetic engineering: The manipulation of genes or genetic material; the direct and deliberate attempts of humans to influence the course of evolution and to alter its products.

Microbe: Another name for micro-organism.

Micro-organism: Tiny organisms like viruses, fungi, bacteria and algae.

Molecule: A group of two or more atoms joined together by chemical bonds in a specific way.

Nucleic acid: Either RNA or DNA.

Patent: The exclusive right to an invention. This monopoly gives its owner the legal right to take action against anyone selling the patented invention or using the patented research without the patentees consent.

Protein: Composed of amino acids. Thousands of proteins exist in living organisms, performing many different functions.

Retrovirus: Viruses which contain hereditary information in the RNA; they are being engineered for use as vehicles to transfer foreign genes into living cells in human gene therapy.

Ribonucleic acid (RNA): A molecule which resembles DNA in structure and helps communicate the genetic instructions in DNA or performs other functions in the cell.

ONLY HEALTHY SEED MUST BE SOWN!



Purity or persecution: a poster produced by the Eugenics Society in the 1930s.

But think. Viruses mutate. Who knows what form they'll take? And microbes fashioned to alter plants or animals could infest humans. For once released they cannot be controlled. The voice of common-sense says we should wait until we know more.

But as laws stand, research is often secret. Consider milk. Are you aware that some milk sold in the US and UK is spiked with a new hormone called bovine somatotrophine or BST which is injected into cattle to increase their yield?⁵ Even though the drug has not been formally released the milk being produced experimentally is being sold in cartons that don't distinguish it from the ordinary kind.

Ask: 'Why wasn't I informed?' You have a right to know. The answer is that most research into the hormone's safety has been done by the companies that make it, like Monsanto or Eli Lilly. Their data is rarely public, lest it damage sales.

There are even fewer laws protecting people in Third World countries. And companies that can't release 'inventions' at home have in the past taken experiments abroad. India even agreed in 1987 that the US could test its genetically engineered vaccines on her citizens.⁵ No wonder some protested at being used as guinea pigs for vaccines not approved for use in the US.

War games

But these outrages pale beside experiments conducted by the US military. Virtually everyone in San Francisco was exposed to a supposedly harmless bacterium when the US Navy 'attacked' the city with it for six days in 1950.¹ How many died? No-one knows. For the bug is not as harmless as first thought. Over 200 top-secret experiments of this nature were conducted by the US military between 1945 and 1969.⁶

Knowing this, wouldn't you like more information about the way military research is employing biotechnology? For the US Department of Defence has no fewer than 100 US corporate and university laboratories plus 18 government laboratories running projects using genetic engineering.⁷ It's anybody's guess what silly schemes they may devise. One CIA plot to topple Fidel Castro involved exposing him to a powder that would make his beard fall out, thereby rendering him less charismatic. Or so the rumour goes.

Harder evidence connects the CIA with African Swine Fever which killed half a million hogs in Cuba.⁸ And the company called Molecular Genetics has won a contract worth nearly two-million dollars from the US Department of Defence to work on Rift Valley Fever Virus, which affects cattle and people in the Middle East. For what purpose we can only guess...

There are no easy solutions to these dilemmas. All we can do is keep a sharp eye and a firm grip on developments. Biotech is a science in the making. If we

act fast there is still time to turn it round. Educating the public is one priority. Demanding research be exposed to public scrutiny is another. We need national and international guidelines about the release of organisms. And committees to defend our rights. Companies should be made liable for damage their products cause. And the time has come to demand that our scientists adhere to a code of moral conduct. They must be held accountable for what they do. □

1 *The Laws of Life*, Cary Fowler, Eva Lachovics, Pat Mooney and Hope Shand, Development Dialogue, 1-2, 1988. 2 Until 1981, when pressure of a lawsuit forced them to stop. 3 *Genethics - The Ethics of Engineering Life*, David Suzuki and Peter Knudtson, (Unwin Paperbacks, 1988). 4 Substitutes are also being developed for vanilla, gum arabic, sugar, cocoa and other major Third World crops. This spells economic disaster for Third World economies dependent on these cash crops and particularly the small-scale farmers who have no other sources of income. 5 *Genetic Engineering - Catastrophe or Utopia?*, Peter Wheale and Ruth McNally, (Harvester-Wheatsheaf, 1988). 6 'Return to Biological Warfare Outdoor Testing?' *Genewatch*, (Vol 4 No 4-5, 1987). 7 'Biological Warfare: The Present State of the Issue', Susan Wright, Statement given to NSF/RAF Citizens Forum, Washington DC, May 8, 1987. 8 *The Killing Winds: The Menace of Biological Warfare*, Jeanne McDermott, (Arbor House, 1987).

Reckless releases

Genetic engineering offers a potential goldmine worth billions of dollars each year. 'Imagining the profits,' says one biotechnologist, 'can unhinge even a sane scientist.' Carol Grunewald reports.

● Four years ago, a new, live micro-organism, genetically engineered by US scientists as an experimental rabies vaccine, was smuggled in a diplomatic pouch into Argentina - a country with no laws regulating biotechnology. The vaccine was then secretly injected into cows without the knowledge of the Argentine Government. A year and a half later blood samples from 17 cow-hands who had been allowed to freely handle the animals and drink their unpasteurized milk, revealed that they had been infected with the virus. More than 130 Argentine scientists charged the private, Philadelphia-based Wistar Institute which had arranged the experiment through the Pan American Health Organization - with conducting an immoral experiment that would never have been allowed to take place in the US. *Forbes*, the leading US business magazine, later stated that such an adventure was understandable given the 'inconvenient' safety regulations in the US.

● At an agricultural research station in Aotearoa (NZ) in 1986, American researchers inoculated 37 calves, 16 chickens and four sheep with a live genetically-engineered vaccine against the sindbis virus, an insect-borne virus which causes flu-like symptoms. The researchers, from Oregon State University, obtained permission and funding for the overseas experiment from the US Department of Agriculture, and subsequently from the Government of Aotearoa (NZ). Alvin Smith, a member of the US team, bluntly stated the reasons for conducting the experiment so far from home: 'In the

US, these tests have been held up by inadequate regulations, lack of government agency co-ordination, court injunctions and public protests.' He might as well have said that lack of public awareness and government regulation of biotechnology in Aotearoa (NZ) made the country an ideal open-air laboratory.

● Without asking or notifying anyone, Gary Strobel, a pathologist with Montana State University, field-tested in four US states an experimental genetically engineered bacterium to fix nitrogen in alfalfa. Three years later, in 1987, Strobel again ignored federal regulations and injected another genetically altered microbe into 14 elm trees to study its effect on Dutch elm disease. Strobel has since been reprimanded by the US Environmental Protection Agency and the 14 trees were burned.

● In 1985 Advanced Genetic Sciences of Oakland, California, received the first Federal permit to test a genetically engineered organism outside the laboratory; a microbe designed to prevent frost from forming on crops such as strawberries. It was soon learned, however, that the company had already illicitly tested the bacterium out-of-doors and had failed to report damage caused by the organism to trees. The Environmental Protection Agency withdrew its permit and fined the company.

Carol Grunewald is an animal rights and environmental activist in Washington DC. She is currently working on a book about politics and the environment.



A BRACADABRA. The powerful tool of biotechnology can transform life to suit human will. It can turn the humble puss into a 'super' cat; make for bumper crops or massive depletion of crop varieties depending on whose interests it happens to be serving. It is not choosy. Biotechnology works for any mistress or master; providing they can show the colour of their money.



WHEN Quincy McKeen of New England holidayed in Guatemala some years ago, he brought home wild flowers, and choosing the most beautiful he claimed it as his discovery and got himself Plant Patent 559. The rainforest did the work but McKeen got the royalties.

Jerry L Stimac of the University of Florida, US, did something similar. He imported a fungus from Brazil which was poisonous to fire ants (and could be used to control them biologically) – and patented it. Scientists had obtained the fungus from Brazilian colleagues who in turn learned of its usefulness from local farmers. This time unnamed farmers had the genius but Stimac got the profits.

Angharad Gatehouse was sent by his university to look for cowpeas in West Africa. He was given a handful, gleaned from farmers' fields, by The International Institute of Tropical Agriculture. Using new biotechniques on the cowpeas, Gatehouse and his friends isolated a specific gene which confers resistance to insect pests and can be inserted into crops like soybeans and maize. Gatehouse moved from the University of Durban to the biotech 'boutique', Agricultural Genetic Company of Cambridge. Once the gene was described, Agricultural Genetics filed patent applications for their 'invention' around most of the Western world. The West African farmers who discovered and used the plant's special qualities have long been forgotten.

Plant piracy of Third World fields and

John Moore's body

Not everything inside John Moore's body necessarily belongs to John Moore. Pat Roy Mooney reports on the transnational companies that claim our organs – and much more besides.

forests is common. Consider the 'Polo' potato from Bolivia now being adapted for Western convenience in the US and probably worth millions of dollars. Or the 'Alcobaca' tomato from Brazil which has a shelf-life of several weeks and could revolutionize the West's tomato industry.

And don't forget medicinal plants. According to the magazine put out by the pharmaceutical industry, *Scrip*, each of the 200 endangered drug-yielding plant species known in the tropical rainforests may have a market value of millions. By early next century the global market for medicinal plants could be worth maybe \$47 billion.¹

The drug company Merck Sharpe and Dohme is working with Brazilian counter-

parts to exploit an anticoagulant called Tiki-uba used by the Urueu-wau-wau of the Brazilian state of Rondonia. Not to be outdone, another major company, Monsanto, is hot on the trail of several of the 1,000 medicinal plants used by the Jivaro peoples on the Brazilian-Peruvian border. The companies not only want the plants but also the knowledge of the people who discovered them.²

Pirates become jailers.

It was in the Philippines about one year ago that much of this information emerged. Rene Salazar, a veteran farm organizer and now also a biotech researcher, sat dumbfounded in an agricultural biotechnology conference as the Philippine Under-Secretary for Science and Technology casually reported that the country's first bill to allow the patenting of life forms had passed third reading in the Lower House.

The Act, to allow the patenting of asexually reproducible plants, offered industry a great deal. First, there was no need to work – no inventive genius was required. A company could merely 'discover' a plant in a cultivated field and – so long as they were first to the patent office – obtain exclusive monopoly ownership over it. As Salazar said, 'The bill rewards craftiness not creativity'. Second, uniquely under Philippine law, anyone else using the patented plant could be criminally liable. In industrialized countries, patent violations are for the civil courts and the onus and cost of patent pro-

tection falls on the company that profits from the patent. Not so under the proposed Philippine law. A company need merely go to the police and charge someone with unlawfully using their variety, and the criminal courts would takeover at taxpayer expense.

Rene Salazar, who also works with the South East Asian Regional Institute for Community Education, was furious: 'Maybe a third to half of the plant varieties on government recommendation lists are either chance mutations or the product of informal community breeding programmes. A Pioneer or a Sandoz company can walk into a farm community, take plant samples, patent the most interesting ones and then throw the community in jail if they continue to use the plants they themselves created.' Within 24 hours, Salazar and a coalition of peasant and environmental organizations had united with scientists to protest against the legislation.

People piracy

On the other side of the Pacific in California it took leukemia patient John Moore a little longer to organize his protest. Moore is venting his spleen over the doctors and the UCLA hospital who claim to have 'invented' his spleen cell-line when they removed the cancerous organ during surgery in 1976. Mr Moore – or at least parts of him – were patented.

By the mid-1980's, UCLA had passed the patent to a small Boston biotech 'boutique' known as the Genetics Institute which in turn passed on exclusive monopoly rights to Sandoz, the giant Swiss chemical transnational that – because it ranks in the top echelons of both drug and seed companies – so worries Rene Salazar. En route, Moore's doctor, David

Golde, and the hospital picked up two and a half million dollars in royalties and 75,000 shares of stock.

Moore's problems are not unique. About the same time in France, a widow whose husband died of testicular cancer, attempted to retrieve some of his semen from the sperm bank. The bank demurred, claiming exclusive rights to the semen. French courts sided with the woman.

Moore also sued for property rights – but lost. Sandoz's lawyers argued that private (patient) ownership over all body materials would send biotech research costs through the ceiling and deny new discoveries. Moore claimed that his rights had been violated and that no-one should own any parts of him but himself. Further court actions are expected.

Be it plants, fungi or people parts, all the new biotech patents spell money. The biotech body tissue trade is substantial – earning an estimated \$2.2 billion in the US last year alone. Recently, a congressional investigation showed a 300 per cent increase over five years in medical schools seeking patents on products drawn from human materials.

What upsets Moore most is that Sandoz could take him to court for selling his own cells to other companies. At least in the US it would be a civil action – but the sad truth remains that not everything inside John Moore is necessarily John Moore's anymore.

In fact, all of John Moore may be up for grabs at the General Agreement on Tariffs and Trade (GATT) talks in Geneva. Buried amidst discussion of European Community agricultural subsidies lies an almost unreported demand from the US, backed by Australia and Japan, that the Uruguay Round should treat intellectual property as a potential



Battle with a sperm bank: widow wins rights.

barrier to international trade: if the Philippines or Brazil fail to offer US companies the same level of patent protection abroad as they expect at home, then this constitutes a barrier to trade.

According to US trade representative Carla Hills, US companies lost around \$60 billion in royalties in 1986 alone, mostly to Third World patent pirates ripping off pharmaceutical patents, textile trademarks, and book and cassette copyrights. Even GATT officials have difficulty taking the US accusations seriously. Were the figures true and the royalty charges levied on the South as Carla Hills demands, the surcharge would double total Third World debt repayments each year.

Trading on life

But the GATT proposal has still wider implications. Says Hills, there should be 'no exclusions' on either the forms of intellectual property or the subject-matter to be patented. In other words, plants, animals, micro-organisms, John Moore's spleen cells and even John Moore himself along with all his products and processes would be patentable. Failure to permit such patents would expose a country to trade retaliation from other GATT members. According to GATT, life is a trade issue.

Although daunted by the reach of the US demand, the EC, Nordic countries and Switzerland have called for the patenting of plants and micro-organisms, leaving it open as to whether or not animals should be patentable. Only Norway, in its written submission to GATT Director-General Arthur Dunkel, has flatly rejected the patenting of human beings.

Most countries in GATT, have overlooked the fact that any acceptance of the patenting of any life-form will inevitably lead to GATT rules for the patenting of all life-forms. The legislative history in



Final verdict: High Court upholds French widow's right to her dead husband's semen.

industrialized countries shows clearly that holding rights over plant varieties leads to exclusive monopoly rights over micro-organisms and then animals. Asked directly whether the US really wanted to include human beings in its patent proposal, a Washington official giggled and admitted that Hills and Company simply could not find a way to exclude humans.

In fact, it is probable that no one in GATT is interested in patenting whole human beings.³ So why not develop wording that does exclude people?

In biotechnology, where fish and insect genes are inserted into crop plants, and human genes are put into mice, pigs, sheep and goats, the 'natural' barriers between species and biological kingdoms are broken down. Life is homogenised. If human beings were excluded from patentability, would the DuPont mouse – the first patented animal – be unpatentable because it contains a human gene? Would pharmaceuticals derived from human tissue be unpatentable? How many human genes can science insert into pigs before they start to read the menu? How many genes can be patented in a human being before the human being is patented?

Faced with these rather ridiculous but real imponderables, the US Trade Representative has opted not to attempt a definition of a human being but to call for no exclusions in the hope of avoiding the entire moral debate.

For Third World delegates in Geneva, the message should be clear: if it is technically impossible to isolate human beings from patentability then new transgenic technologies also make it impossible to isolate plants both from animals and microbes. It is equally impossible to legally isolate 'discovered' from 'invented' biological materials or 'wild' from 'cultivated' materials. To accept the patenting of any life form in GATT is to ultimately accept the patenting of all life forms – including the whole vast biological diversity of Third World fields and forests.

The South is only belatedly becoming aware that the so-called 'raw-material' of the Gene Revolution are the microbial, plant and animal genetic resources abundant in tropical and sub-tropical states. GATT represents a grab for patent control over the sovereign and human intellectual property rights of the South. □

Pat Roy Mooney is a researcher for The Rural Advancement Fund International (RAFI), which campaigns about genetic resources from bases in the US, Canada, Australia and Norway. Together with Carey Fowler, Mooney received the 1985 Right Livelihood Award – the Alternative Nobel Prize – for his work on genetic resources.

1 It is the same with the US National Cancer Institute which is well into a five-year drive to gather more than 1500 medicinal plants from tropical forests and peoples. All the plants are patentable – far from the people who first found them. 2 According to RAFI. 3 In May 1990, RAFI was shown a US State Department memo which pondered the embarrassment that exists in GATT, of holding a position that does not expressly exclude human beings from patentability.



The end of Nature

Human beings could soon have total dominion over Nature. Is this what we really want? asks Judy Gahagan.

THE whole valley was full of impenetrable wreathed cloud, pure white, the palest greys rounding its changeful cupolas and beyond their uneasy marble the great Alps stood intertwined with translucent folds of mist; the peaks themselves were strewn with the strange light of fresh snow; the veils broke, waves of light gaining on seas of light and the rose-gold light of the rising sun. It was like the first day of creation.'

The eyes of Lower Sixth Science Ski Trip turned on him puzzled: 'What have you brought us up here for, sir?' He had no immediate answer. He only supposed that if the sunrise had been a laser show that they had paid to enter they wouldn't have asked the question.

Yawning abyss

The students' bewilderment illustrates a vast hole yawning at the heart of modern consciousness where our innate response to Nature should be. The hole may engulf us as catastrophically as the other hole – the one in the ozone layer. For deprived of an innate feeling for Nature and our place in it we have no basis whatsoever for making ethical decisions about scientific and technological research. Only the mar-

ket exists, the murderous impulses of the most powerful, and the bottomless depths of our own greed for material things. And a fragile rootless idea about 'harm' which collapses into blind-alley debates about costs and benefits: by how much we must reduce our motoring to keep global temperature increases between two degrees centigrade and four degrees centigrade; how sentient must an animal be to permit us to stuff it with poisons; how can we clone trees to replace the ones destroyed by acid rain?

The hole within has brought us charred forests; poisoned seas congealing between concrete tourist complexes; enchanted islands turfed over for golf; precision-planted, herbicide-loving, storm-resistant cloned sycamores; and the hapless oncomouse bio-engineered to be susceptible to cancer.

Our present greed is perhaps understandable. For without material benefits what does the modern rich-world person have left? But to save ourselves and the world we must hunger for different things. Particularly for lost states of mind. The ones you enjoy when you are not lonely, guilty, bored, top-dog of the universe. The ones which might get Lower Sixth



Science standing enraptured at the sunrise murmuring, 'The world is charged with the grandeur of God'.

You have to travel in time and culture to get an inkling of what such awe of Nature might be like, for most of us at the millennial end of the ravages of modernism have forgotten. There have been peoples who lived intimately and reverently with Nature. People who lived in the forests and knew the plants and the herbs, for their medicinal properties, but also for their spiritual and mythological properties; the aboriginals of the Australian deserts for whom every rock, every wallaby was evidence of their cosmology in the Dreamtime. For whom that harsh environment was friend and the source of their existence. For whom harming Nature would have been harming themselves. Such people experienced no separation between their material, artistic, social and spiritual selves. These people did not believe they were more important than the other species they lived among. So why should they dominate the natural world? Or exploit it for purely material motives?

'Aha,' say Lasermind and Great Moghul, 'that is why they didn't survive.'

But a few of them did survive. Some of them are trying to save the forests now. What we learn from them may get us out of our present mess.

Top dog

For such peoples still have their place in the cosmos along with the rest of Nature.

Not like us. Not top-dog. We have no place in the cosmos for we have no cosmos – only dominion over Nature and loads of gadgets. We have no past. Just a future of More and More and Just Us In Charge. Alone in our Themepark with Supertrout and Bio-bunny, for whom we feel no more affection than we might for a couple of Coca-cola bottles, and of course Lasermind and Great Moghul.

But even in our own recent history there have been powerful voices who understood that love and reverence for Nature would be the only ethical and intellectual basis for science, art and politics. Not God (necessarily) but Nature. A century and a half ago in the badlands of the English industrial revolution the prophets already sensed the devastation to come. One of them was John Ruskin, art critic, poet, naturalist and political philosopher, (the description of the alpine sunrise is taken from his *Deucalion*). His ideas about the symbiotic relationships between Nature and art, between Nature and science, between Nature and the politics of work and community, anticipated many of the ideas of the post-modernists (or New Agers) writing today. Yet his world was very different from ours.

Divine purpose

For a start he and his contemporaries believed that every tiny detail of Nature from the mouse's whisker to the plantain leaf revealed divine purpose. They spent long hours interpreting verses from *Deuteronomy* about the structure of dew-fed leaves as opposed to rain-fed leaves or from Genesis on the shapes of mountains, trying to decipher 'God's handwriting' in the complex structures and colours of flowers and birds. Nature was a revelation not a resource.

Soon natural theology (and God) was to be pushed aside by Darwinism and evolutionary theory. Yet Ruskin clung stubbornly to one central fact: for all the power of Darwin's theories in explaining the emergence of species, they were never able to say why Nature seemed so beautiful. Indeed Darwin wrote that the very sight of the peacock's glorious tail made him feel sick. For what was the point of its beauty? He didn't know. It is a question which will agonize the bio-technocrats with identical sycamores and headless chickens when it comes to a marketing angle:

'You must admit it looks kinda tacky,' says Great Moghul. 'You guys have got no *design* sense. Give God his due; he did have taste... I mean how are we going to market it without some autumn woods or a bit of wildlife or something?'

Ruskin was convinced that science could only make real progress, as opposed to destructive progress, if it was informed by a love for the beauty of Nature. 'All true science, as opposed to modern science, begins in the love, not the dissection, of your fellow creatures,' he wrote.

And it wasn't just science that had

been sundered by modern technology. Ruskin's speciality was the study of architecture – especially the Gothic. In the high clustered columns, the complex vaultings, the elaborate tracery and abundant faces, foliage and creatures of the Gothic cathedral he saw direct human expression by mediaeval builders of natural forms.

'What's the point of digging up the views of a long dead eccentric and the customs of primitive people? For better or worse we've moved on,' says Lasermind.

Re-routing science

But the point is that the human psyche is unitary. The seeds of ideas past, present and future from all cultures lie dormant in all of us. We only have to find the conditions for them to blossom again. Those seeds are our potential for change. We have to begin to water the roots of our spirituality in Nature.

'You can't put the clock back or stop the march of scientific progress!' protests Great Moghul.

Yes you can. You can reset the clock where you like and change its time-scaling. And you can re-route the march. For science shall be what we decide it shall be. It can be reductionist, as it has been for a few centuries – fragmenting Nature to even tinier elements and sticking them together again as they were. Or as in the case of genetic engineering, in the way we find more convenient – or the way which will heap up more cash. Or it can be integrative and ecological – emphasising connectedness between all living things following the lead of the quantum physics which suggests a Nature of unbroken wholeness, an intricate order in which things are not separate but folded in each other. We can either deny, as in mechanistic science, a sense of kinship with Nature or make it our starting point. But most important is that we demand scientists not to leave half of their minds outside the laboratory – the part that *loves* nature.

Modern science is based on the idea that science is dispassionate and value-free; that science can only be 'done' if scientists repress those domains of their mind which are concerned with value and feeling. Trapped by their own scientific education they become vehicles of blind market capitalism.

But many of them are already aware of the 'other' hole – not just in their minds but in the minds of most of us. And some of them are also aware that science in tandem with profit-seeking spells apocalypse. They are calling for ethical committees, far-ranging discussions and guidelines. And the guideline that we should give them is a sense of nature to be husbanded and stewarded. Not dominated. And certainly not destroyed. □

Judy Gahagan is a freelance writer and former psychology lecturer based in London.

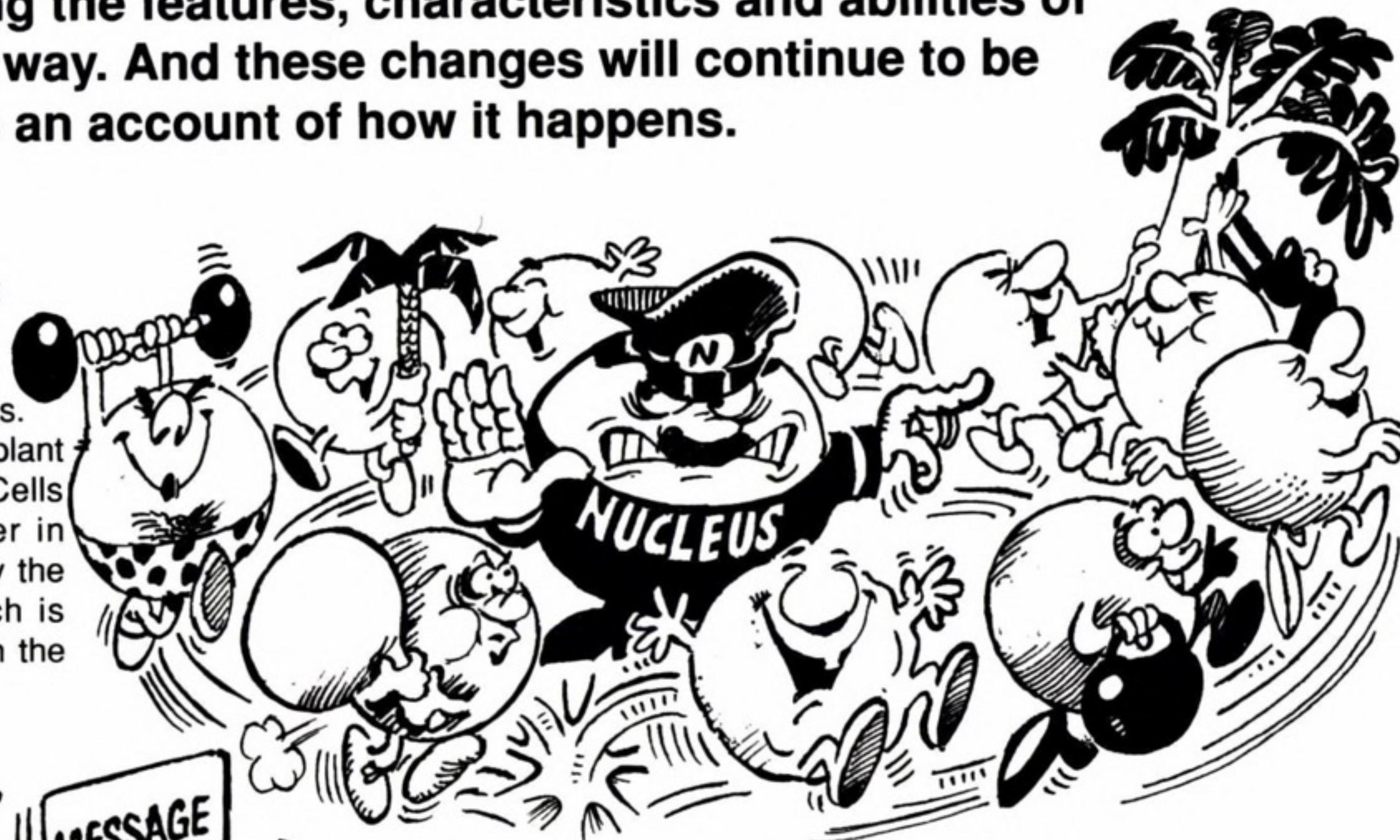
GAMBLING WITH GENES

A GUIDE TO GENETIC ENGINEERING

Genetic engineers are transforming the features, characteristics and abilities of living things in an unprecedented way. And these changes will continue to be inherited for generations. NI gives an account of how it happens.

1. Body-builders

A cell is the smallest part of a living thing that can exist alone. Plants or animals can be made up of one or more cells. Each is adapted to its individual tasks: muscle cells are elastic so that we can move our limbs. Red blood cells carry oxygen through the blood. And plant cells have a rigid cell wall to make the plant firm. Cells manufacture more cells. And all of them, whether in animals or plants, are organized and work in basically the same way. Their control centre is a nucleus which is surrounded by a thin membrane and is often found in the centre of the cell. It directs the cell's activities.



2. Messages and messengers

Cells are made from complex non-living chemicals called biochemicals. We eat three of these as food – proteins, carbohydrates and fats – to provide a chemical supply for the processes that take place in our body. Another biochemical activates them – called deoxyribonucleic acid or DNA. It lives in the cell's nucleus and controls the way that new cells are made and old ones are repaired. It is the cell's information carrier and conveys and alters heredity, as well as containing enough information to build not just another cell but a complete human body. Another kind of nucleic acid, ribonucleic acid or RNA acts as the messenger between DNA and the rest of the cell.

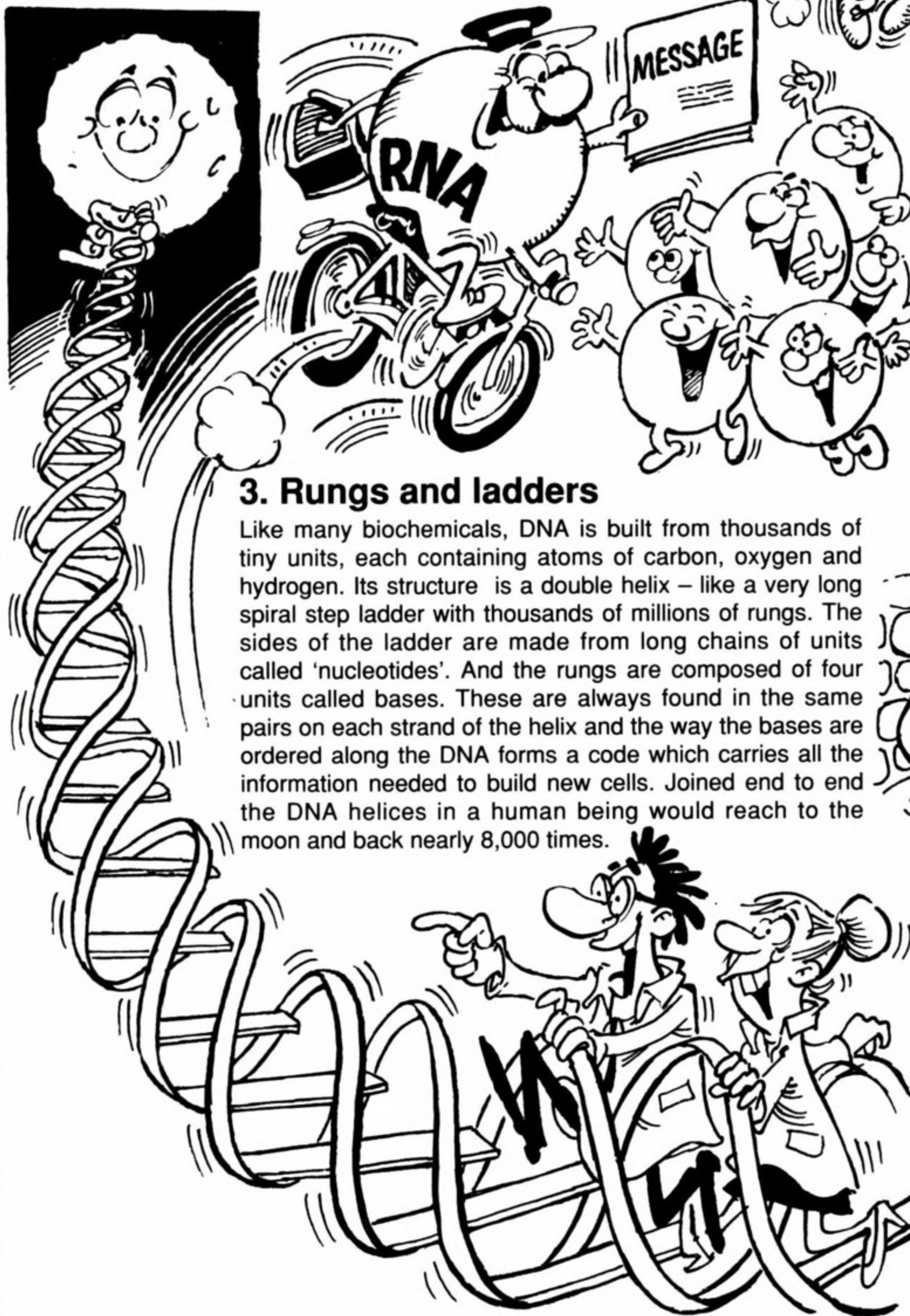
3. Rungs and ladders

Like many biochemicals, DNA is built from thousands of tiny units, each containing atoms of carbon, oxygen and hydrogen. Its structure is a double helix – like a very long spiral step ladder with thousands of millions of rungs. The sides of the ladder are made from long chains of units called 'nucleotides'. And the rungs are composed of four units called bases. These are always found in the same pairs on each strand of the helix and the way the bases are ordered along the DNA forms a code which carries all the information needed to build new cells. Joined end to end the DNA helices in a human being would reach to the moon and back nearly 8,000 times.



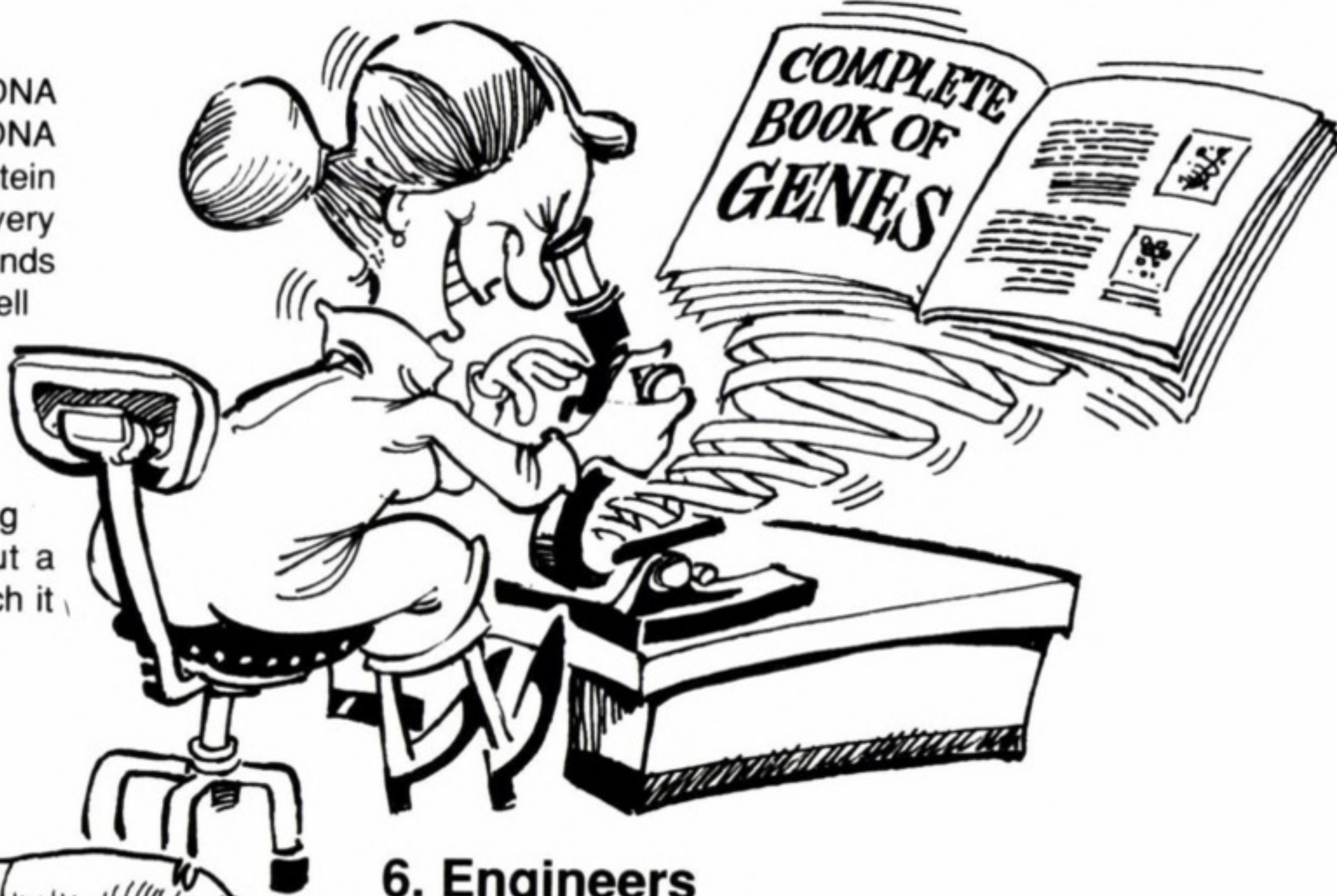
4. Practical proteins

DNA relies on proteins to reproduce cells. These exist in all living things. And there are thousands of different kinds of protein, each composed of various combinations of approximately 20 amino acids, and each performing a different function. Some proteins digest food. Others help make new cell materials. Yet others make the skin tough and flexible. Inside cells, proteins help make new cell materials and build the cells themselves. The special qualities of each individual protein – whether it belongs to a leaf or a root or a muscle depends on the arrangement of the amino acid of which it is composed. And this is determined by information stored in the DNA's chemical code.



5. Chemical sentences

Scientists can read the base units – or 'rungs' – of a DNA molecule according to their sequence. A section of DNA molecule which has the complete code for a single protein is called a gene. There are thousands of genes in every DNA molecule, linked together to form even longer strands called chromosomes. These are usually found in the cell nucleus and occur in pairs: there are 23 pairs of chromosomes in human cells. Each gene is like a chemical sentence: the amino acids are the words, the chromosome is a chapter of the book and the sum of the chromosomes are the final book, containing enough information to build not just another cell but a complete reproduction of the entire organism from which it comes.



6. Engineers

Living things pass on their characteristics to their offspring through DNA – the messenger in the chromosomes. By adding or taking away sections of DNA the characteristics inherited by an animal's offspring can be manipulated. The process of transferring genes from one organism to another is a bit like editing a written text, using scissors and glue to 'cut and paste'. The 'scissors and glue' of genetic engineering are enzymes that enable biologists to snip genes out of DNA molecules and stick them into the DNA of another micro-organism. This way scientists have produced various useful proteins including genetically-engineered insulin, growth hormones and the antiviral protein called interferon. The technology holds potential for diagnosing and treating genetic ailments in humans, for improving food production and for performing other useful tasks. But it could also do enormous harm because it alters the structure of organisms in ways we can't necessarily predict. Once released into the environment we can't control these as we don't know what they will do.



7. Decision-makers

The way that genetic-engineering is used depends on who controls the technology. At present a handful of multinational companies in the North control it and their priority is to boost their profits rather than to serve human need. While the technology could be useful in developing pest-resistant crops which might increase agricultural production, chemical companies are creating herbicide-resistant seeds so that they can increase their herbicide sales. They have developed hybrid seed which does not breed true and so forces farmers to buy more seed from them every year. And other companies are developing artificial substitutes for crops that Third World farmers depend on, which could devastate Third World economies. These decisions are too important to be left up to multinational companies. They affect everyone. This technology is so powerful that we must use it wisely. Which means finding out what the world needs and acting accordingly.



Evan's progress

Imagine a world where children play with do-it-yourself genetic engineering kits and we can all change our body forms at will. Paul McAuley takes us there.

ON Evan's eighth birthday, his aunt sent him the latest smash-hit biokit, *Splicing your own Semi-sentients*. The box-lid depicted an alien world throbbing with weird, amorphous life; a double helix spiralling out of a test-tube was embossed in one corner. 'Don't let your father see that', his mother said, so Evan took it out to the old barn, set up the plastic culture trays and vials of chemicals and retroviruses on a dusty workbench in the shadow of the shrouded combine-harvester.

His father found Evan there two days later, watching the amoebae he'd created coalesce into a slimy blob soon to be transformed into a jellyfish. Evan's father dumped the culture trays and vials in the yard and made Evan pour a litre of industrial grade bleach over them. The acrid stench made Evan cry.

That summer, the leasing company foreclosed on the livestock that Evan's father rented. The rep who supervised repossession of the supercows drove off in a big car with the test-tube and double-helix logo on its door.

Next year the wheat failed, blighted by a particularly virulent disease. Evan's father couldn't afford the new resistant strain, and the farm went under.



Evan lived with his aunt in the capital. He was 15. He had a street bike, a plug-in computer, and a pet microsauro (also known as a triceratops with purple funfur). Buying the special porridge – all the microsauro could eat – took half of Evan's weekly allowance. So he let his best friend inject the pet with a bootleg virus to edit out its dietary dependence. It was only a partial success: the triceratops no longer needed its porridge but developed epilepsy triggered by sunlight. It shed fur in great swatches, so Evan abandoned it in a nearby park. Microsauros were out of fashion anyway. There were dozens wandering the park. Soon they disappeared, starved to extinction.



The day before Evan graduated, his sponsor firm called to say that he wouldn't be doing research after all. There had been a change of policy: the previously covert gene-wars was going public. When Evan began protesting, the woman said sharply, 'You're better off than many. With a degree in molecular genetics you'll make a sergeant at least.'



The jungle below was a vivid green blanket in which rivers made silvery forked-lightnings. Evan leaned from the helicopter's hatch; the harness dug into his shoulders. He was 23, a technology sergeant. It was his second tour of duty.

Flashes on the ground. Evan hoped the peasants only had Kalashnikovs. Last week some gook had downed a 'copter with an antiquated SAM: the tech sergeant had been too busy aiming sticky virus-suspension spray to kill the maize crop.

Afterwards, the pilot, an old-timer, said over the intercom, 'Business gets dirtier every day. In the past we just used to take a leaf from Third World plants and clone it to get our supercrops. You couldn't really call it theft. But this stuff ... I always thought war was bad for business'.

'Not in this case,' Evan said. 'Our company owns the copyright to the maize that those peasants are growing. They haven't got licences to grow it.'

'Man, you're a real company guy,' the pilot said admiringly. 'I bet you even know what country this is.'

'Since when were countries important?'



Rice fields spread across the floodplain like a hand-stitched quilt. In every paddy, peasants bent over their reflections planting seedlings.

In the centre of the UNESCO delegation, the Minister for Agriculture stood under a black umbrella held by an aide, explaining why his country was starving to death after a record rice crop. Evan was at the back of the little crowd, bareheaded in the warm drizzle. He wore a smart one-piece suit, yellow overshoes. He was 28 and had spent two years infiltrating UNESCO for his company.

The Minister was saying, 'We have to buy pesticide-resistant seed to compete with our neighbours, but the rice has to be exported to service our debt. We are starving in the midst of plenty.'

Evan stifled a yawn. Later, at a reception he got the Minister on his own. The man was slightly drunk.

'Look in our cities,' the Minister said slurring his words. 'Every day a thousand refugees pour in from the countryside. We have kwashiorkor, beri-beri.'

Evan popped a canapé in his mouth. (One of his company's new lines, it squirmed lasciviously before he swallowed it.) 'I may be able to help,' he said. 'The people I represent have a new yeast that fulfils all dietary requirements and will grow on a simple medium.'

'How simple?'

Evan explained as the Minister, no longer drunk, steered him towards the terrace. The Minister said, 'You understand this must be confidential. Under UNESCO rules...'

'There are ways around that. We already deal with five countries that have trade imbalances similar to your own. We lease the genetic material of the yeast to support governments who look favourably on our other products ...'



The gene pirate was showing Evan his facility for editing genetic material, when the slow poison finally hit him. They were aboard an ancient submarine somewhere off the Philippines. Missile tubes had been converted into fermenters. The bridge was crammed with the latest manipulation technology.

'It's not facilities I need,' the pirate told Evan, 'it's distribution.'

'No problem,' said Evan. The pirate's security had been easy to penetrate. He'd tried to infect Evan with a zombie virus, but Evan's designer-immune system had easily dealt with it. Slow poison was so much more subtle: by the time it could be detected it was too late. Evan was 32. He was posing as a Swiss grey market-broker.

'This is where I keep my old stuff,' the pirate said, rapping a stainless steel vat. 'From before I went big time. Remember when the Brazilian rainforest started to glow? That was me.' He dashed sweat from his forehead, frowned at the room's complicated thermostat. Grossly fat and completely hairless, he was wearing only bermuda shorts and shower sandals. He had been targeted because he was about to break the big time with a novel HIV cure. The company was still making big money from its own cure: they ensured AIDS had never been completely eradicated in Third World countries.

The pirate rapped the thermostat with shaking hands. 'Hey, is it hot in here, or what?'

'That's the first symptom,' Evan said. He stepped sideways as the gene pirate crashed to the deck. 'And that's the second.'

The company had bought the pirate's security chief. Evan had plenty of time to fix the fermenters. By the time he was ashore, they would have boiled dry. On impulse, against orders, he took a sample of the HIV cure with him.



'The territory between piracy and legitimacy is a minefield,' the assassin told Evan. 'Definitions shift according to convenience – and that's where I come in. My company likes stability. Another year and your company would have gone public: probably the shares would have made you a billionaire. No-one else has cats these days. We thought their genetic material

was eradicated back in the twenties. Very astute of you, going for the luxury market.' She frowned. 'Why am I talking so much?'

'For the same reason you're not going to kill me,' Evan said. 'It seems a silly thing to want to do,' the assassin admitted. Evan smiled, 'I need someone like you in my organization. And since you spent so long getting close enough to seduce me, perhaps you'd do me the honour of becoming my wife. I'll need one.'

'You don't mind being married to a killer?'

'Oh, that. I used to be one myself.'



Evan saw the market-crash coming. Genewars had reduced cereals and many other cash crops to gene sequences stored in computer vaults. Three global companies held patents on the calorific intake of 98 per cent of humanity. But they had lost control of biotechnology. Pressures of the war economy had simplified it to the point where anyone could directly manipulate their own genetic material, and hence alter their own bodies.

Evan had made a fortune in the fashion industry, selling templates and microscopic self-replicating robots which edited DNA. He guessed that someone would eventually devise an artificial photosynthesis system to imitate the way that plants turn organic compounds into food using chlorophyll (which makes plants green) by absorbing sunlight. Evan's stock-market systems were programmed to correlate research in the field. He and his wife sold controlling interests in their company three months before the first green people appeared.



'I remember when you knew what a human being was,' Evan said sadly. From her cradle, inside a mist of spray, his wife said, 'Is that why you never went green? I always thought it was a fashion statement.'

'Old habits die hard.' The truth was he liked his body the way it was. These days, going green involved getting body cells to mutate into a metre-high black cowl to absorb sufficient light. Most people lived

in the tropics, swarms of black-caped anarchists. Work was no longer a necessity but an indulgence. Evan added, 'I'm going to miss you.'

'Let's face it,' his wife said, 'we never were in love. But I'll miss you, too.' With a flick of her powerful tail she launched her streamlined body into the sea.



'They wish to honour you by taking your genetic material to Mars,' the little purple microsauro said. Evan sighed. 'I just want peace. To rest. To die.'

'Oh Evan,' the microsauro said patiently, 'surely even you know that nothing really dies any more.'

Paul McAuley lectures at St Andrews University, UK. His novel, *Four Hundred Billion Stars*, is winner of the Philip K. Dick award, and Gollancz have just published his short story collection, *The King of the Hill and other stories*.



BIOTECHNOLOGY - THE FACTS

Biotechnology is one of the most powerful technologies the world has ever known. It will affect us all. NI looks at the direction it is taking.

1. CONTROLLING COMPANIES

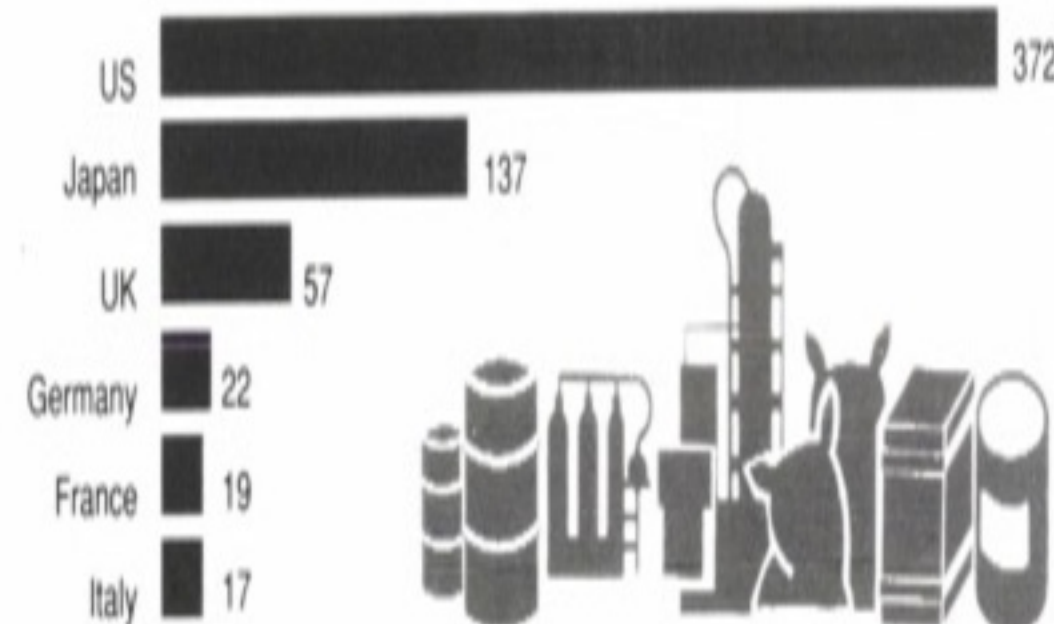
By the year 2000 the global seed market will probably be controlled by just 12 seed and chemical giants.¹

The leaders in 1986 were:²

Parent firm	Industry	Seed sales (in million \$)
Pioneer Hi-Bred (US)	Seed	734
Shell (Anglo-Dutch)	Petrochemicals	350
Sandoz (Swiss)	Chemicals	290
Dekalb-Pfizer (US)	Petrochemicals	201
Upjohn (US)	Chemicals	200
Limagrain (French)	Seed	172
ICI (UK)	Chemicals	160
Ciba-Geigy (Swiss)	Chemicals	152
Orsan (French)	Chemicals	119
Cargill (US)	Agribusiness	115



Biotechnology is a growth area. The table below shows the number of firms involved in biotechnology, according to country in 1985. Most of the companies are involved in medical diagnosis, agriculture, chemicals and fermentation.³



2. HERBICIDES BOOM

The genetics industry promotes the use of chemicals. Ciba-Geigy coats its sorghum seeds with three different chemicals - one of them to protect the seed from a herbicide that Ciba-Geigy itself manufactures.

● US State and Federal agricultural institutions have devoted \$10.5 million of taxpayers money to fund genetics research to make crops and trees herbicide-tolerant over the past few years.⁴ Thirty crop and forest-tree species - including cotton, corn, wheat, rice, potatoes, soybeans and sunflowers - are being modified to withstand lethal or damaging doses of herbicides.

● At least 27 corporations - including Ciba-Geigy, ICI, Monsanto and Bayer⁵ - have initiated 63 programmes to develop herbicide-tolerant crops, the market value of which is expected to touch \$6 billion by the year 2000.⁶

● According to industry projections, use of crops tolerant to Hoechst's herbicide, Basta, would increase its global sales by \$200 million a year.

● Strong evidence links alachlor - the most popular herbicide in the US - to malignant tumours. It contaminates groundwater in 12 US states.⁷



3. NEGLECTED NEEDS

Third World needs are rarely met by the new biotechnologies.⁸



What is needed?

Poor people's crops need conserving and improving to make them more pest-resistant, more nourishing and higher yielding.

What is being done?

Instead of making crops pest-resistant some companies are making them chemical resistant to increase chemical sales. In general only major cash crops are being bred to yield more.

What could be done?

Traditional crop varieties could be conserved and new crops selectively bred for hardiness.



What is needed?

Third World people need clean water, preventative health care, improved sanitation and nutrition most of all. Next come new vaccines for tropical diseases.

What is being done?

Tools for medical diagnosis (rather than treatment) are being developed, along with hormone production and drugs to prevent aging and cancer. Organ transplants and gene therapy are also top priority.

What could be done?

Biotechnology could provide better techniques for water testing and vaccine production.



What is needed?

Poor people need cheap, nourishing non-perishable food produced in a culturally and environmentally-friendly way.

What is being done?

Raw materials are being reduced or substituted by artificial ones and agricultural products are being produced in factories.

What could be done?

Traditional biotechnological methods of food preservation like fermentation could be further developed.



What is needed?

The Third World needs to conserve its genetic diversity. Poor people need livestock which live longer and produce more.

What is being done?

Attention is directed at complete control over animal reproduction, developing uniform (but very vulnerable) breeds of animals, and veterinary drugs and equipment.

What could be done?

Vaccines and ways of diagnosing diseases could be developed. Cross breeding could create healthier, more efficient livestock.

4. GENETIC EROSION



Of 75 types of vegetables available during the early 20th century, approximately 97% of the varieties of each type are now extinct. The table below shows a sample of US vegetable varieties that disappeared between 1903 and 1983.⁵

Vegetable	Total varieties in 1903	% of varieties lost by 1983
Artichoke	34	94.1
Asparagus	46	97.8
Runner beans	14	92.9
Lima bean	96	91.7
Garden bean	578	94.5
Beets	288	94.1

5. STEALING SPECIES

Western countries are plundering the Third World's genetic resources.

● Wild species of plants and animals (many of which come from the Third World) contributed \$340 million per year to the US between 1976 and 1980. The total contribution of wild species to the US economy has been estimated at \$66 billion - more than the total international debt of Mexico and the Philippines combined.

● A wild tomato variety taken from Peru in 1962 has contributed \$8 million a year to the US tomato-processing industry. None of these profits or benefits have been shared with Peru.

● The periwinkle plant from Madagascar is the source of 60 alkaloids which can treat childhood leukemia and Hodgkin's Disease. Drugs derived from this plant bring the US \$160 million a year. And another plant, Rauwolfia Serpentina, from India is the basis of drugs the sales of which generate up to \$260 million a year in the US alone.

● The value of the South's genetic material for the pharmaceutical industry ranges from an estimated \$4.7 billion now to \$47 billion by the year 2000.⁶



6. GALLOPING SCIENCE

Biotechnology developments are racing ahead of legislation to control them.

● The number of unclassified US Department of Defence projects using genetic-engineering technology and monoclonal antibodies jumped from zero in

1980 to over one hundred in 1984; spending on the US programme increased by over 900 per cent between 1979 and 1986. Over 100 corporate and university laboratories plus 18 government laboratories are now involved in this work.⁷



● In 1988 the US Department of Energy allocated \$10 million and the US National Institutes of Health a little over \$17 million to a major programme to map the human genes (Human Genome Project).⁸

● The market for genetic tests and tests for predispositions to genetic disease is predicted to reach between \$50 million to \$1 billion by 1992.⁹

● An estimated 400 companies worldwide are developing genetically-engineered products. By the year 2000 over 1,000 new products will be on the market at a value of over \$50 billion.¹⁰

1 The Frankenstein Syndrome, Agscience, March 1988. 2 The Gene Hunters, Celestious Juma (Zed Books 1989). 3 The Laws of Life, Development Dialogue Journal 1-2, Dag Hammarskjöld Foundation, Uppsala, 1988. 4 Biotechnology's Bitter Harvest, Biotechnology Working Group, Washington DC, March 1990. 5 Shattering: Food, Politics and the Loss of Genetic Diversity, Cary Fowler and Pat Mooney, (University of Arizona Press 1990). 6 Biodiversity Conservation: The Threat to Ecological Conservation from Commercial Interests, Vandana Shiva, (Third World Network) 1990. 7 The Bio-Revolution: Cornucopia or Pandora's Box?, Peter Wheel and Ruth McNally, (Pluto Press 1990). 8 Genewatch Vol 6 Nos 4-5, 1989.

The great miracle baby business

Babies are being sold in kit form – an egg here, a sperm there, a uterus somewhere else. Celia Kitzinger takes a close look at biotechnology's answer to infertility.

THE world's first 'test-tube' baby, Louise Brown, was born in July 1978 in England. Since then reproductive technologies have been big news in the West. Newspaper and television interviews with radiant mothers nursing new-born babies portray doctors and scientists as glamorous heroes selflessly promoting 'miracle cures' for infertility. Reproductive technologies, it is claimed, ease the heartache for childless women, offering them a last chance to hold a baby of their own in their arms.

Between 10 and 15 per cent of heterosexual couples are involuntarily infertile, and for many this causes intense grief. The longing for a child can take over a woman's life. There are enormous cultural pressures on women to bear children, and tremendous stigma attached to infertility.

The method used to conceive Louise Brown, *in vitro* fertilization (IVF), is done by bringing together ovum and sperm in a petri-dish on a laboratory bench. Usually the ovum and sperm are taken from the would-be parents, but either or both can come from other people, so that a woman can bear a child with no genetic relationship to her or her husband. Once a viable embryo has been achieved, it can either be deep-frozen and stored for later implantation (or use in experiments), or it can be transferred straight into the mothers' body.

The procedure presents serious health hazards for women. The hormones given to encourage superovulation – the production of more than one ripe egg per month bring the risk of burst ovaries, ovarian cysts and other adverse reactions ranging from migraine, dizziness, vision problems, weight gain and depression, to breast and ovarian cancer. The surgery is performed under general anaesthetic and involves three incisions into a woman's abdomen after distending her belly with carbon dioxide. Women on these programmes are rarely informed of the risks they are taking: if they complain about pain or side-effects, they are often told that this demonstrates a lack of commitment to having a baby.

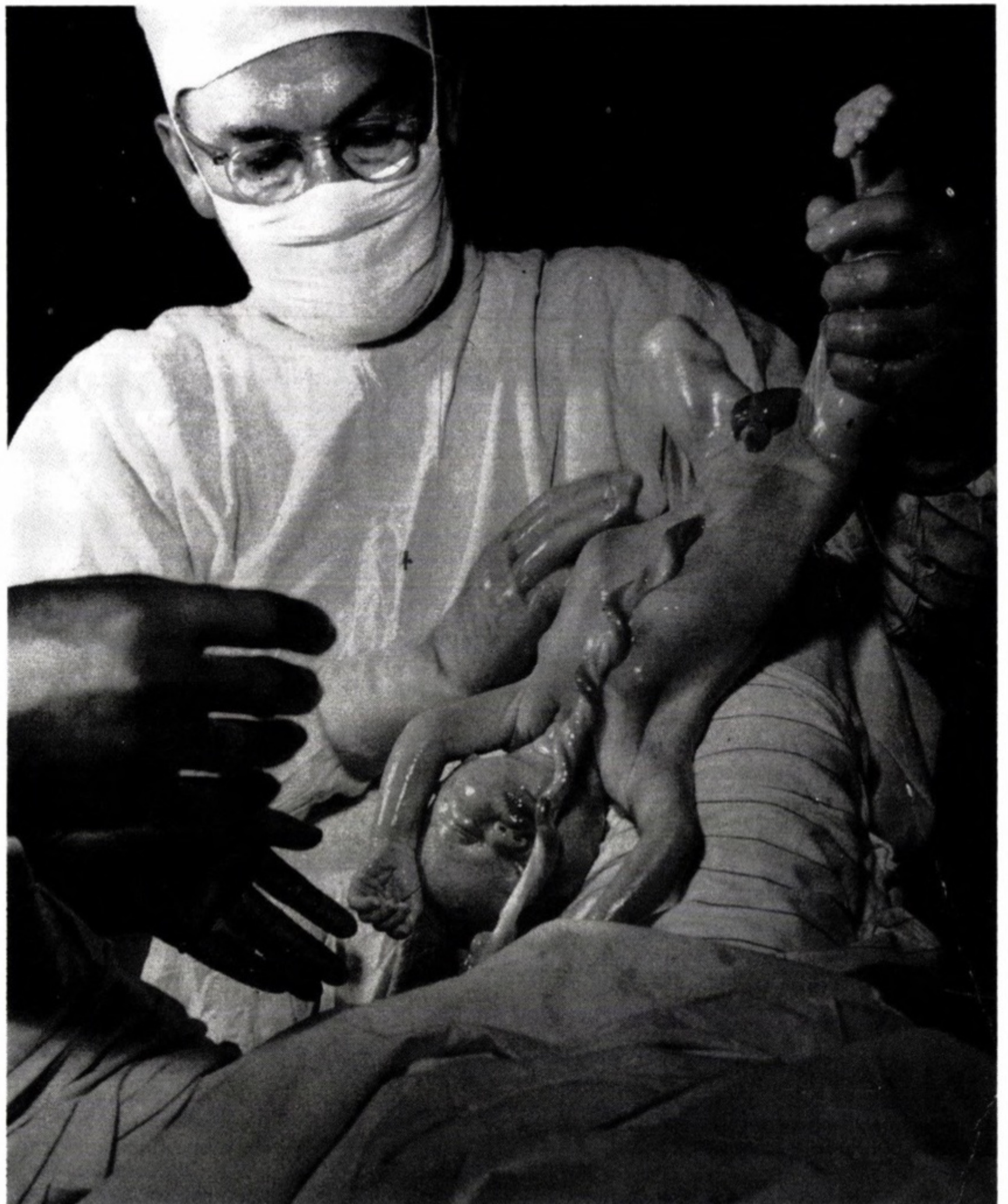


Photo: Wayne Miller/Magnum

Nor are women told how low the success rate is. Half the IVF clinics in the US have *never* sent a patient home with a baby. Overall, only one in every ten women leaves IVF treatment with a baby – and evidence suggests that many of these could have conceived without IVF. For 90 per cent of women, IVF treatment means doctors' appointments, hospital visits, tests, repeated invasive examinations, surgery, tremendous anxiety, depression, disruption of work, strain on personal relationships, disappointment, hope, despair – all without a baby at the end of it. These stories are missing from the media hype.

Mad miracle

Instead women are given misleading statistics, in which every pregnancy – even those lasting only days – is included as a 'success', or the number of babies born is divided by the number of women in the programme, so if one out of ten women becomes pregnant with sextuplets, it is reported as a 60 per cent success rate.¹ The media implies that reproductive technology is an exciting 'scientific breakthrough' and modern miracle when the results suggest it is a *failed* technology.

Women who have been in IVF programmes – even those who *did* end up

with a baby – describe feeling 'like guinea pigs', 'just a statistic', or 'a disappointment to the doctors'. When they embark on such programmes, many already feel inadequate and guilty because of their infertility. The treatment they receive reinforces their negative self-image. One woman explains how she felt when her fertilized eggs failed to implant:

*'I had terrible feelings of guilt that my body was this damaged vessel incapable of letting life continue. It was difficult for me to think that I would be carrying around fertilized eggs that would die one more time. I didn't think I could stand any more dead babies.'*²

Scientists on IVF programmes often describe the women they treat as 'non-achievers' and 'failures' with 'defective' bodies which can only be fixed with technology. Many are punitive, and blame women's infertility on supposed infections contracted from sexual promiscuity, or on earlier abortions, or they chastise patients for pursuing careers and postponing child-bearing until it is too late.

Women who reveal distress about their treatment are classified as emotionally unstable and unworthy of becoming mothers. 'I didn't dare ask too many questions because I thought it might affect my posi-

tion in the queue,' says one woman. Another explains: 'I would have liked to have gone back and talked to my gynaecologists after it didn't work, but as (an IVF scientist) said: "You're history; we are on to the next one; we haven't time for you now".'³ A third woman was dismissed with the explanation that it was 'psychologically beneficial to experience failure'.

A high proportion of pregnancies resulting from infertility treatments are multiple pregnancies – with associated risks to both mother and babies. In 1987 an English woman gave birth to six live babies, all of which died. Another delivered quins: one died shortly after birth, one had neonatal convulsions, one is blind and has inflammations of the intestines, one had a shunt inserted for hydrocephalus, and the fifth has chronic lung disease.¹ Some women, horrified by prospects like these, have aborted multiple pregnancies, but then live with appalling guilt added to grief at their infertility.

Even healthy multiple births are an enormous strain. One woman with two-year old quads cautions others contemplating the same course: 'Unless you have lots of money and lots of help, there is just not enough of you to go round'.

Winning fame

So why is reproductive technology portrayed as a success? In part reproductive scientists are using women's bodies to advance their own careers. Medicine has always needed an experimental human population on which to develop its techniques: black slaves, white working-class women, prostitutes and Third World peoples have all been used. The treatment of women for infertility provides a voluntary, eager, experimental population from whom data on various other frontiers such as biochemistry, genetic transfer, tissue construction and so on can be gathered.

'I want to be out there in the very front,' says one doctor, adding 'the grant money in my area dried up; so I became interested in infertility.' Another doctor, excited to be working at the frontiers of science, compared reproductive researchers to the creators of the atom bomb.⁴

But more importantly reproductive technologies are governed by marketplace values: social pressures on women to produce babies are being exploited by big business. Sperm, stored in 'banks', is now a saleable commodity. US sperm donor Ken is making as much money for five minutes in the bathroom as he does for almost a whole day in his job as a law clerk. Surplus eggs removed from women's bodies are used for a range of scientific experiments or, in the US, sold to other women unable to produce their own ova. Eggs of women over 40 are described as 'unsalable stock'. An embryo is, in medical phraseology, 'the product of conception'. Some embryo flushing and transfer procedures have been patented and franchises formed, and profit-making

clinics spring up wherever a ready market exists. In effect, babies are being sold in kit form – an egg here, a sperm there, a rented uterus somewhere else.

Much of this marketing is presented as scientific progress when it is nothing of the sort. Take surrogacy. The only 'technology' used in most cases is the low-tech or no-tech procedure of artificial insemination which has probably been around for centuries.⁵ What is new is the industry constructed around it.

Surrogate motherhood is a commercial transaction in which a man buys the services of a woman to bear him a child and perpetuate his genes. It does not usually involve a contract between two women, and in the US a contract between the sperm donor and the mother has more legal standing than a contract between the man's wife and the mother.⁶ At least one North American programme accepts single men who want babies of their own, but usually the man who buys the service has an infertile wife. Often she has children by a previous marriage but her new husband wants his own biologically related off-spring. The surrogate mother is no more than a human incubator.

As babies become products, mothers become producers, pregnant women the unskilled workers on a reproductive assembly line... Mothers, rather like South African diamond miners, are the cheap, expendable, not-too-trustworthy labour necessary to produce the precious product writes Barbara Katz Rothman, feminist sociologist.⁴

The control of women's reproductive ability has long been a cornerstone of patriarchal power. For centuries women's wombs have been policed through clitoridectomy and infibulation, denuncia-

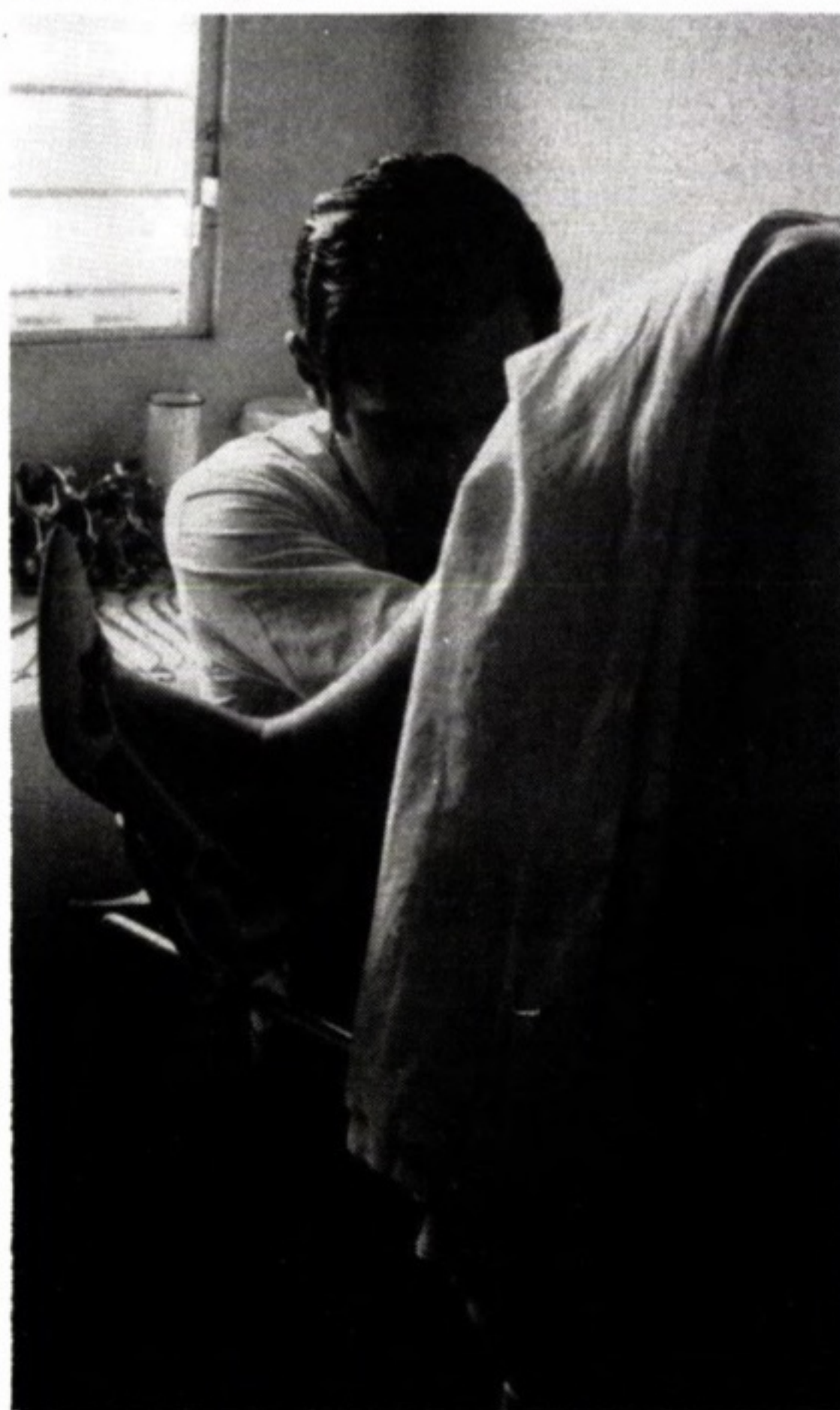
tions of female sexuality, punishments for infidelity, repressive laws against abortion and compulsory sterilization. Today we are seeing an extension of this control over women's bodies, through the development of reproductive technologies.

These technologies routinely sort women into fit versus unfit reproducers – medically controlled artificial insemination is available almost exclusively to white, able-bodied, heterosexual women, preferably married. Sperm and ova are screened to ensure that both are of the best possible quality, to assure a 'perfect' product, and in future, according to a one-time President of the American Association for the Advancement of Science, women 'will not have the right to burden society with a malformed or a mentally incompetent child'. Perhaps we will all be directed to sperm banks like the one in California stocked only with the sperm of Nobel prize-winners and men of achievement – although only one in every fifty women who apply for insemination is considered good enough.

While scientists scramble to develop prestigious technology to 'solve' infertility, concern about medically-induced or environmental causes of infertility is almost absent. The medical profession has often caused the infertility it attempts to correct – IUDs double the risk of becoming infertile and oral contraceptives aggravate the growth of fibrous tissues in the ovaries, also leading to infertility. Female and male infertility is also caused by pesticides, weapons-testing, crop dusting, chemicals used in industry and tobacco marketing. Spurred on by visions of higher profits, these industries, like the reproductive industry, continue virtually unchecked.

Reproductive technologies may offer a beacon of hope to infertile couples: they may even help a lucky few realize their dream. But while attempting this, many women endure humiliating, painful, even life-threatening side-effects. Most have to accept a childlessness made harder to bear by the shattering of unrealistic expectations – raised to generate profits for big business. Others are forced by poverty to sell their services as human incubators to male baby-buyers. Women need to know the limitations and risks involved in reproductive technologies. And they need legal safeguards so that the rights of the poor and vulnerable are not sacrificed to maintain the illusion of choice for a few, rich, white western heterosexual couples. □

Celia Kitzinger teaches psychology at the University of Surrey, UK.



Groping in the dark: medical mechanics.

¹ Quoted in Judith Laskar and Susan Borg, *In Search of Parenthood* (Pandora, 1987). ² Quoted in Jocelyne Scutt, *The Baby Machine*, (Merlin Press, 1990). ³ In introduction to Laskar and Borg by Sheila Kitzinger, 1987 ⁴ *Recreating Motherhood: Ideology and Technology in a Patriarchal Society*, Barbara Katz Rothman (Norton and Co., 1990). ⁵ The first recorded case of successful artificial insemination was in 1884 – done during a medical examination of the woman without telling either her or her husband. ⁶ *Infertility: Women Speak Out About Their Experiences of Reproductive Medicine*, Renate D Klein, (Pandora, 1989).



The shrinking pool

A biological holocaust is sweeping the Third World. Kunda Dixit reports on what it is doing to peasant farmers.

PURNA Bahadur Tamang and his wife truss up their maize crop on the front porch of their house in a tiny mountain village in northern Nepal. Although the crop is bountiful this year, Purna must sell most of it to repay money he borrowed last year for buying seeds, fertilizers and pesticides.

The orange maize looks healthy, but Purna Bahadur sarcastically calls it *bikasay makai* or 'development' maize. 'It doesn't taste as good as the traditional varieties I used to plant,' he says.

Purna Bahadur used to plant different varieties of rice on different terraces according to variations in altitude, soil moisture and sunlight. Now he plants one variety each of maize and rice. Like many Nepalis he gives half his crop to his landlord, so when government extension workers came to the village five years ago with high-yield rice and maize he welcomed the chance to improve his harvest.

The story is the same across the Third World. Of 5,000 food plants that used to be grown worldwide a few centuries ago, modern agriculture uses only 150. Most people rely on five cereals, three legumes and three root crops to meet their calorie needs. Even among these, valuable strains are vanishing.

But Purna finds other things wrong with the new rice and maize besides the taste. The dwarf plants produce little straw for his buffaloes. And the new seeds only yield better harvests if he pampers them with expensive artificial fertilizers, and irrigates the terraces with scarce water. Elsewhere in Nepal epidemics have wiped out crops in entire districts sown with the same 'devel-

opment' hybrid.

The same happened in the Philippines where nearly 90 per cent of the country's farms are sown with five expensive high-yielding seeds: the paddy harvest was nearly eliminated when the hybrid was attacked by a pest in the 1970s. Although new strains of pest-resistant rice have been found, the country still relies on a narrow gene base for crops – which makes them vulnerable to new diseases.

Crops can only be bred for resistance using the genes of wild and native plant varieties. And the world's genetic diversity is vanishing. Up to a million species of plants and animals – about 10 per cent of the known number – could disappear in the next 15 years, taking with them invaluable sources of future food and medicine.

The destruction of rainforests in genetically rich areas of the world is the main cause of this biological holocaust. But the disappearance of native food plants can be blamed squarely on modern agricultural economics, which demand uniformity.

Developing countries which have most of the world's genetic wealth don't have the resources to protect them. And western transnational corporations, seed companies and privately-funded research organizations have stepped up efforts to collect varieties in a form of 'genetic imperialism'.

Indeed, one big European company recently 'took' the genes from a wild berry that grows in Nigeria and is producing thaumatin, a sweetener nearly 2,000 times sweeter than sugar. When the firm goes into industrial production with its 'super sugar', the Nigerians will not get a share of the spoils, and worse, the livelihood of

Wheat and millet: many varieties have already vanished from farmers' fields.

many sugar-cane farmers in the Third World could be threatened.

It is thought that just ten transnationals control nearly one-third of all cereal varieties. Their local subsidiary firms gather seeds from remote regions of the Third World, breed them with other varieties or change them with biotechnology, and are beginning to patent the result and sell them back to the Third World.

Chemical transnationals like Ciba-Geigy, Shell and Sandoz are raking in profits by acquiring seed companies and competing for a slice of the \$50 billion-a-year seed trade. One of their strategies is to merge their pesticides and seeds research. Ciba-Geigy coats its sorghum seeds with three different chemicals – one of them to protect the seed from a herbicide that Ciba-Geigy itself manufactures.

There are some small glimmers of hope as increasing numbers of Third World farmers are recognising the true worth of their traditional seeds. In the Philippines, a farmer-scientist partnership has launched a project called *Masipag*, to involve farmers in the selection and breeding of rare rice varieties. Similar projects exist elsewhere in South and Southeast Asia, supported by European voluntary groups. Also, new community seed banks are beginning across the Third World in a bid to rescue vital seeds. They involve communities in low-cost breeding, making them aware of the value of traditional varieties and returning control over them.

These are small seeds of hope, that control over the world's genetic resources can be returned to ordinary people before it is too late. But everyone knows that from small seeds, great things grow. □

Kunda Dixit is the regional editor for InterPress Service in Asia.

WHEN I was young and working at a nature centre in Michigan, I met many botanists. I thought them wonderful people: grown women and men crawling around on their hands and knees in the forest, ecstatic over finding some little liver-coloured orchid. Or in their greenhouses, planting terrariums full of ferns to put beside their reading chairs to cheer a winter's day. Botanists loved nature and got paid for pursuing a harmless hobby. That is what I thought. So I trained to become a botanist myself and for the last ten years I have been a professor of biology, leading a research team in the investigation of plant embryos and pollen development.

Although I still believe that most botanists are good-hearted, nature-loving people, I now realize that we scientists have been blinded by a myth of neutrality and purity which enables us to ignore the consequences of our work. Botanical research is vital to the spread of western agriculture, which is as disruptive to social and ecological systems as any human practice yet devised, including war. This realization caused me to quit research and seek other ways of acquiring and using knowledge.

Scientists like myself learn the myth of neutrality as research students. In plant science, the story handed down goes something like this:

We design and execute experiments because we are curious about the world. The Government gives us money through science foundations to research plant science because it is concerned to ensure society can feed its growing population. Plant scientists need not worry about possible applications of their research because these are likely to be in agriculture. If better plants are produced they will yield more and more people will be fed.

Teaching scientists to believe this story ensures they have no interest in analyzing the role of research in society. If science is pure and neutral, and scientists work for love not money, what is there to worry about?

But I found the myth hard to rationalize. It seemed unlikely that the US Government was really concerned about poverty and hunger given its past record, or that it was far-sighted enough to invest in research with a low probability of pay-off.

And I realized too that new

Confessions of a botanist

Martha Crouch was leading a research team in plant molecular biology until she realized she was being manipulated by a myth. She reveals why she blew the whistle on agribusiness.

high-yielding plants do not necessarily solve world hunger, as the results of the Green Revolution show. They may increase agricultural output, but they also bump up costs because they need more fertilizers, pesticides and herbicides. Only rich farmers can afford the new technology. They grow more crops for export – like cotton, soybeans and oil palm – and as their plantations expand, poor people are driven from the countryside to live in city slums. This pattern has recurred throughout the Third World and even in the US.

The real winners from the higher-yielding, uniform plant varieties, are the multinational corporations that supply the inputs: Monsanto, Ciba-Geigy, Dupont, Atlantic Richfield, Unilever, for example. Bankers also profit by loaning big money

to Third World countries to build the roads, dams and processing plants necessary to maintain cash crop economies: debt repayment has created a net flow of money from the impoverished South to the banks of the North. Contrary to the scientists' myth, the fruits of scientific knowledge benefit the well-off, not the poor who really need help.

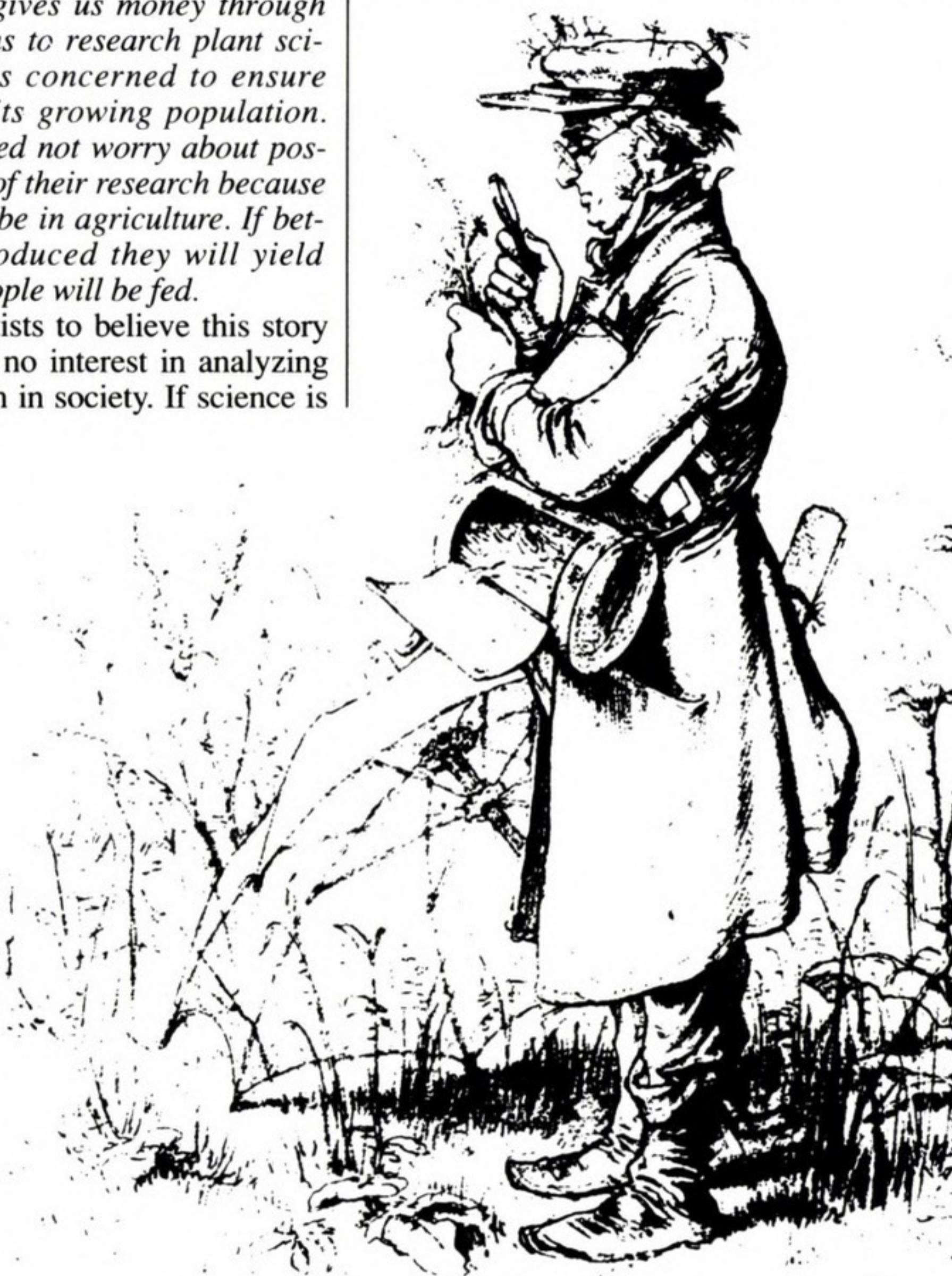
When I realized all this, I started considering the kinds of research my colleagues and I were doing. Did we really choose what was most interesting or were our imaginations manipulated by the needs of agribusiness?

In biology there is a heavy bias towards funding the most reductionist areas: much more is spent on the study of molecules and cells than on ecology, for example. Research likely to be useful for biotechnology receives a disproportionate amount of money – and thus talent – for it is most likely to generate results that can be patented, or which require special expertise to develop, thus generating profits. Ecological principles are no less useful for the farmer wishing to control pests, or to conserve water. But their application is less likely to result in tangible money-spinning products, like seeds, chemicals or machines.

Most scientists are unaware that their research interests are shaped directly by funding, and indirectly by status and other rewards. Or that their subject areas are determined ultimately by the needs of agribusiness. I myself was fully participating in the agenda of agribusiness without realizing it: I consulted for big companies where members of the biotechnology team at two big companies, Monsanto and Dupont, were sitting on grant panels at the National Science Foundation, helping to decide how public money was spent. I published results as fast as my lab could generate them without considering the consequences. My closest colleagues were spread equally between academic and industry labs, doing indistinguishable kinds of research. And I did not question any of this.

But when I realized how the myth of plant science operates, I had to stop and do something else. In April 1990 I wrote an essay describing the destructive effects of my own research – helping to produce more uniform oil plants which would ultimately undercut Third World economies – which stimulated many scientists to write to me about their own similar concerns. Today I am working to change agriculture back towards a decentralized, non-export system of local food production. Until food is removed from the realm of global commodities, new knowledge about plants will always be used against nature and against the poor. □

Martha Crouch is Associate Professor at Indiana University in the US and lectures in the biology of food.



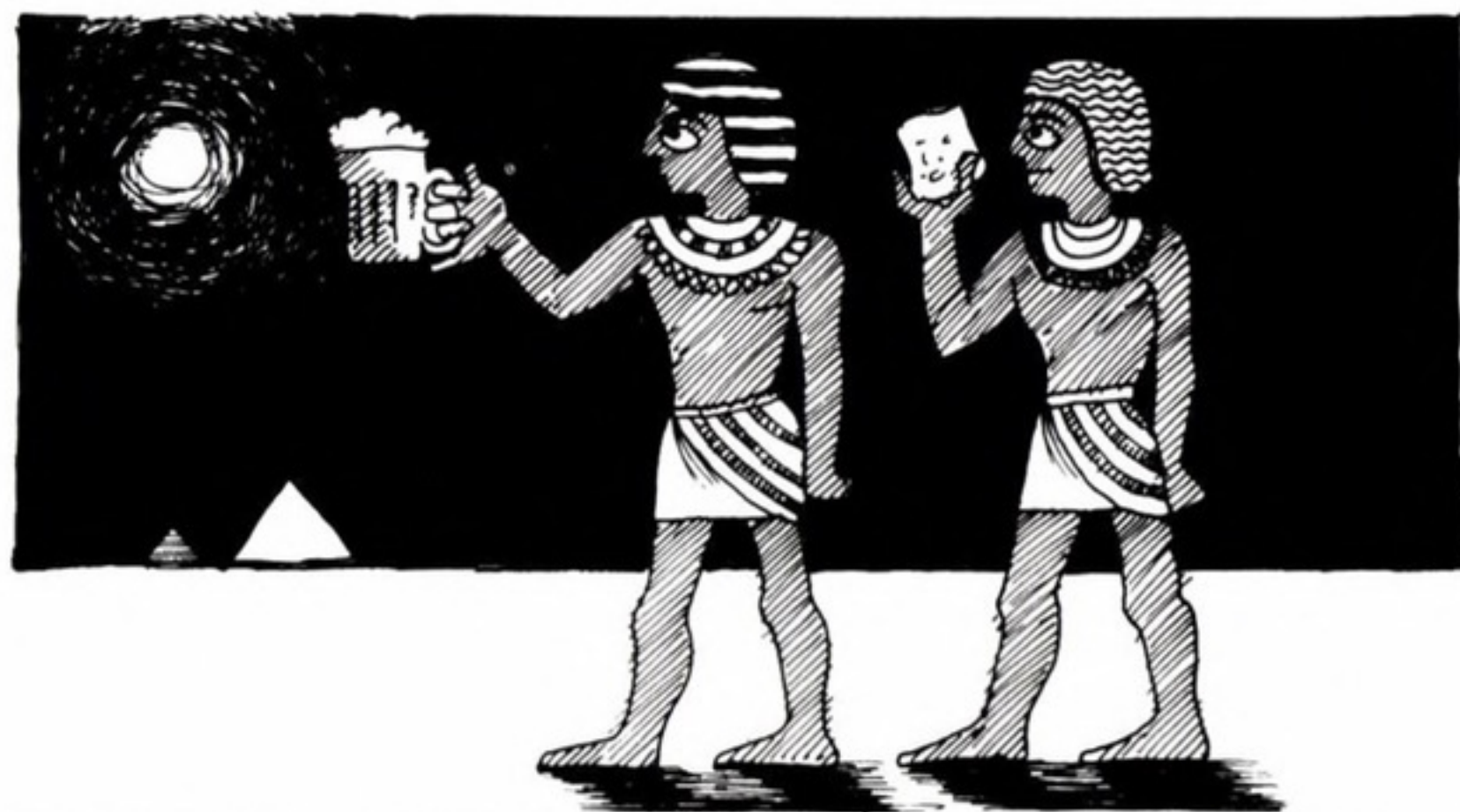
A History of Biotechnology

The gene revolution may be sweeping us along at breathtaking speed but biotechnology is as old as bread and cheese. NI examines the science that began in the kitchen.

1 Ancient technology

Biotechnology involves using living organisms in the production of food and medicine. It dates back several thousand years to when people inadvertently discovered the usefulness of one-celled organisms like yeasts and bacteria. The ancient Egyptians, for example, used yeast to brew beer and to bake bread. Some 7,000 years ago in Mesopotamia people used bacteria to convert wine into vinegar. And ancient civilizations exploited tiny

organisms that live in the earth by rotating crops in the field to increase crop yields. They didn't know why it worked: Theophrastus – an ancient Greek who lived 2,300 years ago – swore that broad beans left magic in the soil. It took another 2,200 years before a French chemist suggested in 1885 that some soil organisms might be able to 'fix' atmospheric nitrogen into a form that plants could use as fertilizer.

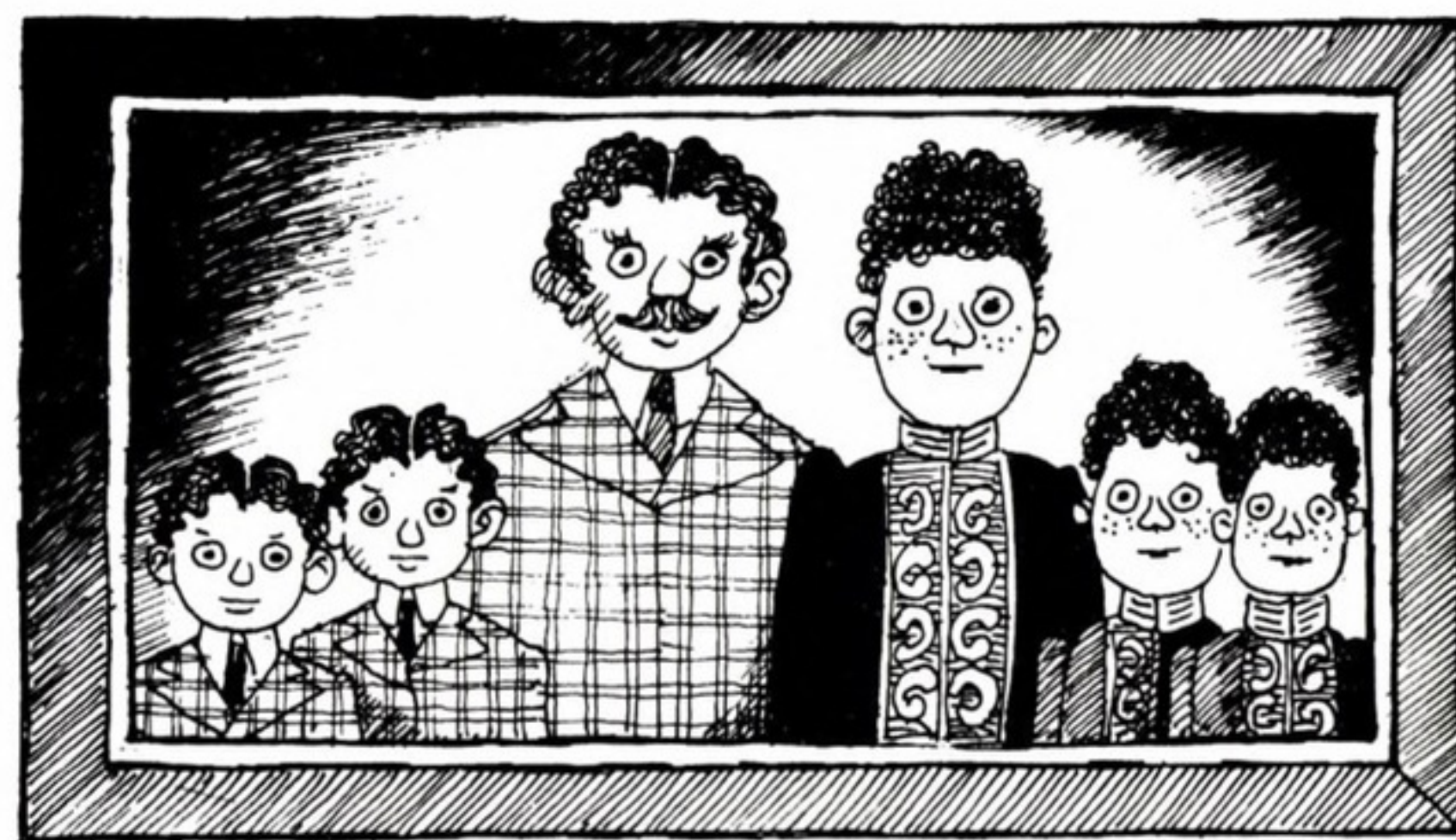
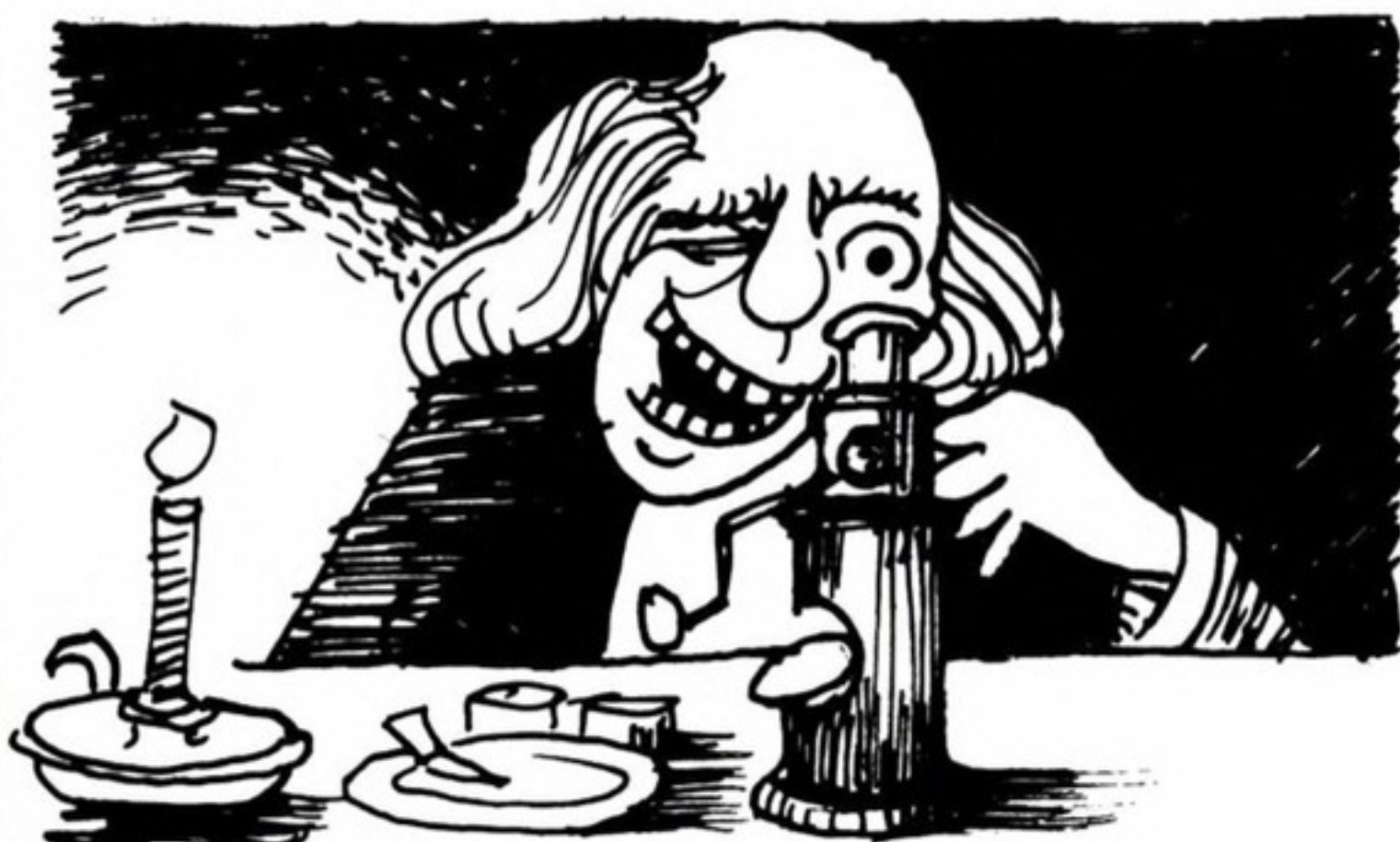


2 Gene wealth

People worldwide have long recognized that genetic resources such as plants are linked to economic growth. Since ancient times rulers have sent plant-collectors to gather prized exotic species – in 1495 BC Queen Hatshepsut of Egypt sent a team to the Land of Punt (modern Somalia and Ethiopia) to gather specimens of plants that produced valuable frankincense. Likewise in modern times colonial powers mounted huge plant-collecting expeditions across Latin America, Asia and Africa, installing their findings in botanic gardens. These early 'gene banks' helped the colonials establish agricultural monocultures around the globe: a single coffee tree from Arabia planted in the Amsterdam Botanic Garden in 1706 originated most of the coffee grown in South America. And the British started growing Chinese tea plants in the foothills of the Himalayas in their first big attempt to establish an economic base using an exotic plant in the colonies. By the late 19th century, India had displaced China as the main exporter of tea to Britain.

3 Unexpected applications

Although baking bread, brewing beer and making cheese have gone on for centuries, the scientific study of the biochemical processes is less than 200 years old. Clues to understanding fermentation emerged in the 17th century when Dutch experimentalist Anton van Leeuwenhoek examined scrapings from his teeth under a microscope and discovered microbes. Two centuries later the Frenchman Louis Pasteur untangled some of the complex processes that yeast used in fermenting beer. The fermentation process was modified in Germany during World War I, to produce glycerine for making the explosive nitroglycerine. Similarly military armament programmes discovered new technologies in food and drink industries which helped them win battles in the First World War. For example, they used the bacteria which convert corn or molasses into acetone for making the explosive, cordite. While biotechnology helped kill soldiers, it also cured them and Sir Alexander Fleming's discovery of penicillin proved highly successful in treating wounded soldiers.

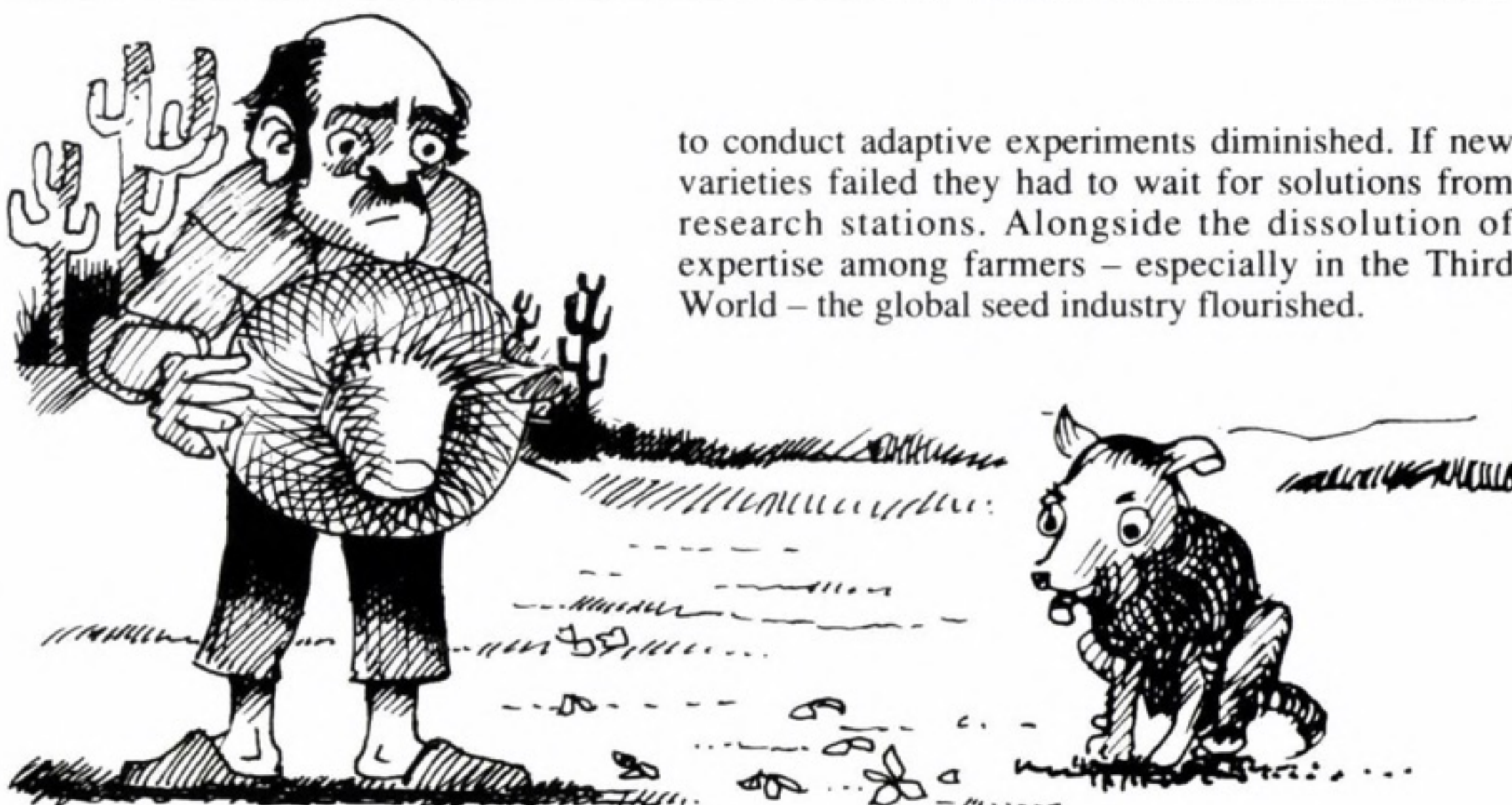


4 Genetic breakthrough

Biotechnology leaped forward when Gregor Mendel announced his belief that there were 'units of heredity' – later called genes – which did not change their identity from generation to generation but only recombined. The science of 'genetics' was born in 1906. Derived from the term 'genesis' which relates to the origin of a thing, genetics tried to explain how organisms both resemble their parents and differ from them. It was believed that every gene corresponded to specific traits directly. The science was used to promote the theory of genetic determinism, whereby life-forms are viewed as machines controlled by genes in linear chains of cause and effect. By the 1920s genetics was helping plant breeders improve their crops. But when applied to people the correspondence between genes and traits led to simplistic interpretations of human behaviour as resulting largely from genetic make-up. Combined with Darwin's ideas of the survival of the fittest, the new science was used to justify racism and sexism and underpinned notions of racial hygiene which led to the extermination of six million Jews by Nazi Germany.

5 Seed industry

By the 1940s, genetics had transformed the US into a leader of monoculture agriculture – which relied on a narrow range of genetic material and considerable high technology. The Green Revolution arrived in the 1960s. Agriculture became obsessed with output. Use of artificial fertilizers increased. Seedless varieties became popular – especially fruit and vegetables – and so did hybrids which reduced the viability of crops over generations, forcing farmers to buy fresh seed every year. The world's gene pool has been shrinking rapidly ever since and many varieties have vanished for ever. Power and resources became concentrated among fewer farms, and farmers became dependent on the suppliers of seeds and inputs to provide them with crop varieties and fertilizers. Cut off from knowledge – and thus control – over the raw materials of farming, the farmers became less autonomous, and their capacity



to conduct adaptive experiments diminished. If new varieties failed they had to wait for solutions from research stations. Alongside the dissolution of expertise among farmers – especially in the Third World – the global seed industry flourished.

6 Double helix

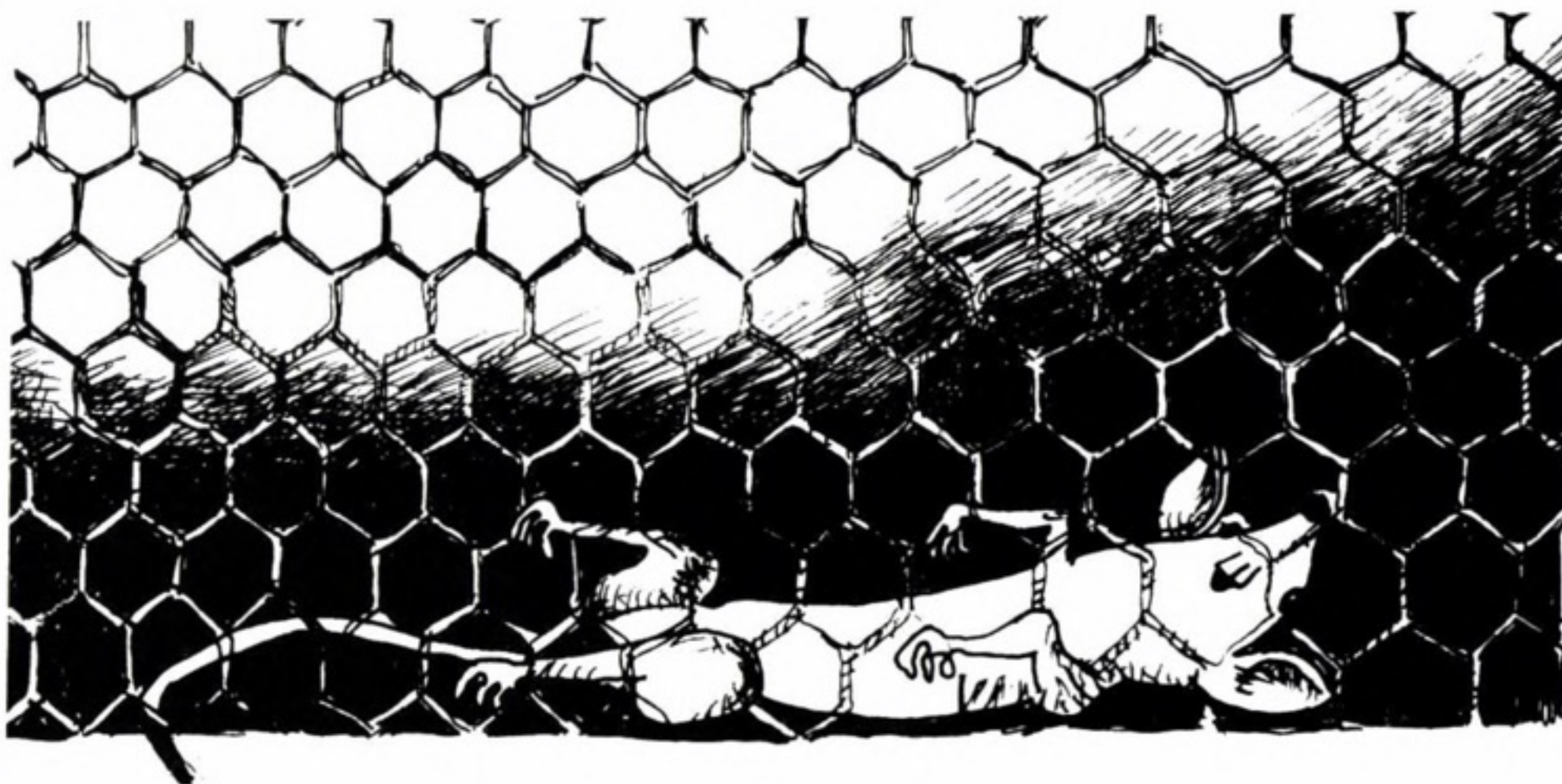
The science of genetics was transformed by the discovery of DNA (or deoxyribonucleic acid). This is the molecule which carries the hereditary information in the cells. The chemical DNA had already been found in 1869 but was not taken seriously as the chemical basis of genes until the early 1950s. Two scientists, Francis Crick and James Watson, discovered that the DNA structure was a double helix: two strands twisted around each other like a spiral staircase with bars across like rungs. The structure, function and composition of DNA is virtually identical in all living organisms – from a blade of grass to an elephant. What differs – and makes each creature unique – is the precise ordering of the chemical base in the DNA molecule. This gave scientists the idea that they might change this ordering and so modify life-forms.



7 Genetic engineering

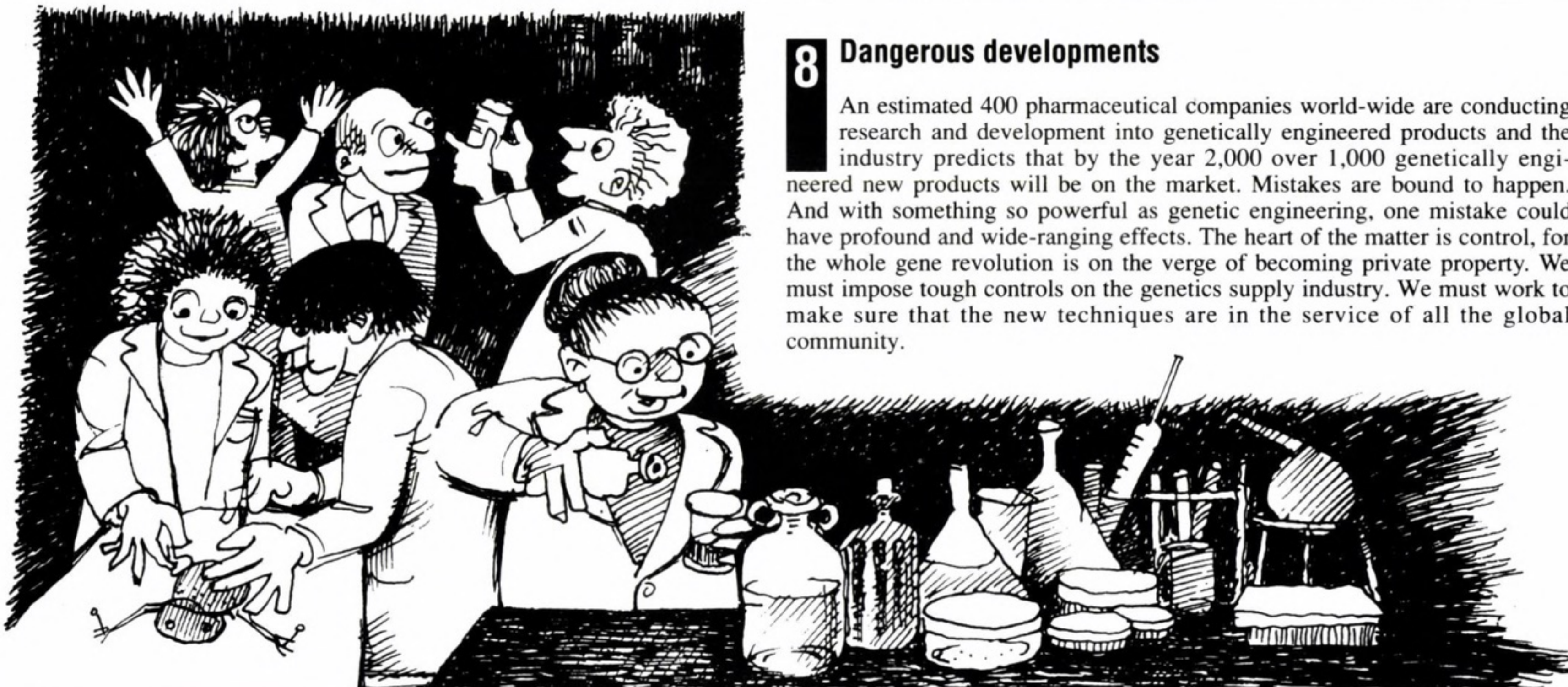
Soon scientists and industrialists were seeking to alter the genetic make-up of living things by transferring specific genes from one organism to another. They can now modify life-forms by altering the hereditary material at a molecular level. And since the US company Genentech became the first to develop technology to rearrange DNA in the mid-1970s, others have followed. Commercial uses include the development of interferon, insulin and the high-solids-processing tomato which has 20% less water and through which

Campbell Soup expect to achieve huge savings. Transgenic animals have been created like the unfortunate onco-mouse designed to develop cancer ten months after birth. Companies have been assisted and encouraged in their research by the 1980 ruling of the US Supreme Court allowing genetically engineered micro-organisms to be patented. This means that virtually any life-form on this planet can theoretically become the private property of the company or person who 'creates' it. One of the greatest threats of the new bio-sciences is that life will become the monopoly of a few giant companies.



8 Dangerous developments

An estimated 400 pharmaceutical companies world-wide are conducting research and development into genetically engineered products and the industry predicts that by the year 2,000 over 1,000 genetically engineered new products will be on the market. Mistakes are bound to happen. And with something so powerful as genetic engineering, one mistake could have profound and wide-ranging effects. The heart of the matter is control, for the whole gene revolution is on the verge of becoming private property. We must impose tough controls on the genetics supply industry. We must work to make sure that the new techniques are in the service of all the global community.



Improving the human race

A three-billion-dollar project to map human genes has been launched. Some anticipate that it will herald an era in which all diseases and medical frailties will be revealed, identified and banished. Jack Doyle finds this rhetoric chillingly familiar.

A LITTLE knowledge is a dangerous thing, especially when it is about the genetic composition of human beings. But a little is all we have. And on the basis of it much medical biotechnology assumes that who we are and what we are is determined by our genetic make-up. Genes are destiny. Therefore knowing genes – all 100,000 of them – is knowing us.

To know genes one must find them, which is the aim of one of the biggest bio-science projects in history: the Human Genome Initiative. This three-billion-dollar, 15-year odyssey, recently approved by the US Congress, aims to map and detail the bio-chemical 'blueprint' of humankind. Having done this, modern science will then have its 'holy grail', as one researcher put it, the roadmap to begin administering a Golden Age of Biomedicine, an era in which all diseases and medical frailties could be revealed and banished from the face of the earth. And perhaps much more as well.

Critics of the Human Genome Initiative fear that it will facilitate a new kind of eugenics and social discrimination. This is already happening, and will become more common as diagnostic testing, genetic screening and the use of new DNA-based identification systems become more widespread. Consider the following examples reported in the US:

- A health insurance company refused to insure a two-year-old boy diagnosed as having the gene for polycystic kidney disease. The condition – which damages the kidneys – does not cause health problems until adulthood and then can progress quite slowly.

- A doctor told a couple that their health plan would be cancelled unless the woman terminated her pregnancy because genetic testing had revealed her unborn child had cystic fibrosis. The insurance company backed down after a lawsuit was threatened.

- A patient diagnosed as carrying a

gene for Gaucher's disease was denied a government job even though the patient wasn't expected to get sick.

- A couple's application to adopt a child was denied because one spouse had a family history of Huntington's disease and was thought to risk developing the inherited disorder.

These cases may only represent the tip of the iceberg. Equally worrying is the possibility that employers and government officials may resort to widespread genetic screening of workers, criminals, government employees or the general public. All this is likely, critics say, because more and more genetic information – whether accurate or not – is becoming available.

Money spinner

Nevertheless enthusiasm for projects like the Human Genome Initiative is unbounded in some quarters. 'It's going to tell us everything,' says George

Cahill, vice president of the Howard Hughes Medical Institute. 'Evolution, disease, everything will be based on what's in that magnificent tape called DNA.' The prestigious National Academy of

Sciences has thrown \$200 million-a-year funding at the project for the next 15 years. And a range of commercial interests have lined up behind it, each with their own specific goal in view.

Computer manufacturers anticipate the development of all kinds of computers while drug companies envisage a cornucopia of new drugs. Companies providing gene therapy also stand to gain – several have been formed precisely with such sales in mind.

And the diagnostics industry will benefit enormously from predictive testing kits. Twelve million Americans are thought to carry the genes for cystic fibrosis and the industry guesses that millions of people will want to know whether they have that gene. Some US geneticists have even suggested a nationwide cystic-fibrosis-screening programme of all people of reproductive age, which would pull in an estimated \$200 million to one billion dollars.

The avalanche of new diagnostic testing will have major social repercussions. Genetic and prenatal testing now available is already being used disproportionately by the rich and educated, sowing the seeds for a new kind of bio-social

Making asses out of humans: the Human Genome Initiative will cost a fortune and could be used to screen and treat people in some suspect ways.



stratification. And some diagnostic firms are pressing hard on the limits of ethical practice in order to open profitable new markets.

Last year, for example, just before an article appeared in the *New England Journal of Medicine* confirming the ability to diagnose the cystic fibrosis gene, several commercial laboratories wrote to doctors urging them to send samples of the patients' blood for testing. This was despite a formal statement by the US Society of Human Genetics declaring it inappropriate to offer the test to people without a history of cystic fibrosis.

Today in the US very few effective legal restrictions prevent employers from performing medical tests on job applicants – or control the way test results are used. One blood sample might reveal considerable information about an individual's health or genetic vulnerabilities and predispositions, but US employers are not required to give a reason for refusing to hire her or him.

Money spinner

Genetic information is being compiled at a furious pace in public and private research laboratories world-wide. Much of it is stored in sophisticated retrieval systems, available to a wide network of users. Increasing amounts of genetic information from hospitals, universities, companies and other sources will be lodged in these data banks. It could easily be co-ordinated and centralized under the rubric of research.

One author¹ has already proposed correlating each person's health records, psychiatric records, and scores on personality and intelligence tests. A powerful computer might turn up all sorts of suggestive relationships between genes and traits which further study could then validate. This information – names, addresses and all – might well get into the hands of diagnostic firms, drug companies, food companies and other commercial interests.

A multinational company could use the new information much like conventional businesses now use census data to project consumer preferences and life-style changes in order to prepare product lines. Knowing when certain diseases attack a certain section of the population would enable companies to provide a cradle-to-grave picture of what to sell and when to sell it, whether a home diagnostic kit, a drug or gene therapy. The possibilities are endless.

DNA-identification systems are now being used in certain legal proceedings – like the controversial 'DNA fingerprinting' whereby blood samples or even a hair follicle give a unique personal signature. Laws requiring mandatory 'DNA typing' of certain people – usually sex offenders – and the creation of central facilities for storing the results have been adopted in the US by the States of Virginia, Washington and Arizona. In May 1989,

the State of Maryland enacted a law that allows the identity of any party in any legal proceedings to be proved or disproved by evidence of DNA profile.

Finally, there is eugenics, which the dictionary defines as 'the science of improving the qualities of the human race', but which history has coloured more darkly. In the 19th century, new discoveries in the fields of evolution and heredity spawned a pseudo-science whose leaders professed that undesirable traits should be purged from the human gene-pool while desirable ones should be propagated. Eugenics fuelled the Third Reich of Adolph Hitler, who bred Germans for a master race while exterminating millions of Jews under the guise of promoting racial purity.

Eugenics thinking has recurred in recent times. According to one account: 'Francis HC Crick, soon after receiving the Nobel Prize (for his discovery of the DNA's double helix structure) ... discussed eugenics and genetics at a symposium of biological scientists. He toyed with the idea that the Government might use food additives to control fertility. Then licences granting the right to bear children could be issued to worthy citizens. The British geneticist explained: "I do not see why people should have the right to have children ... if one did have a licensing scheme the first child might be admitted on rather easy terms. If the parents were genetically unfavourable, they might be allowed to have only one child..."'²

Today some critics fear that modern science and projects like the Human Genome Initiative may serve the purposes of eugenicists. Salvador Luria, a respected biologist, wrote to *Science Magazine* in 1989: 'Will the Nazi program to eradicate Jewish or otherwise "inferior" genes by mass murder be transformed into a kinder, gentler program to "perfect" human individuals by "correcting" their genomes in conformity perhaps to an ideal "white, Judeo-Christian, economically successful" genotype?'

Given all the unpleasant side effects and unwelcome socio-economic trends that the Human Genome Initiative and like activities are certain to release in coming years, there is every reason to call for a moratorium on the project until certain legislated safeguards can be established. Public funds have no business laying the groundwork for genetic discrimination, or for creating a handy catalogue for the next eugenics demagogue who comes along. New civil rights and privacy laws are needed – fast. □

Jack Doyle, author of *Altered Harvest* (Viking-Penguin), is Senior Analyst for Technology and Corporate Policy with Friends of the Earth in Washington DC.

¹ Robert Right *New Republic* (July 1990). ² Reported by Leon J Kamin, Professor of Psychology at Princetown University and co-author of *Not in Our Genes*.

WHAT YOU CAN DO

- **Demand** that all biotechnology research is open to public scrutiny – especially that related to the release of genetically engineered organisms.
- **Insist** on tougher controls over the release of genetically-engineered organisms.
- **Lobby** your Government for a moratorium on the Human Genome Project until there has been open and informed public debate on the issue.
- **Campaign** for a ban on the patenting of life forms until there has been proper public debate.
- **Insist** that all foods which have been genetically engineered are 'tagged' to identify them.
- **Press** for public representation on all committees that monitor developments in biotechnology. A Public Biotechnology Commission should be set up to advise government ministers.
- **Insist** that companies are held liable for any damage their products cause.
- **Demand** funding for more government research into applications of biotechnology which would help the Third World.

USEFUL ADDRESSES

AOTEAROA (New Zealand): Greenpeace, Private Bag, Wellesley Street, Auckland.

AUSTRALIA: Australian Conservation Foundation, 340 Gore Street, Fitzroy, Victoria 3065.

CANADA: Rural Advancement Fund International, PO Box 188, Brandon Manitoba R7A 5Y8. **Canadian Council for International Co-operation (CCIC)**, 1 Nicholas Street, Suite 300, Ottawa, Ontario K1N 7B7. **Science for Peace**, University College, University of Toronto, Toronto, Ontario M5S 1A1. **Heritage Seed Programme**, RR3, Uxbridge, Ontario L0C 1KD.

UK: The Genetics Forum, 258 Pentonville Road, London N1 9JY. **Norfolk Education and Action for Development**, 38 Exchange Street, Norwich, NR2 1AX. **Bio-Information International Ltd**, 25 Northlands Street, Camberwell, London SE5 9PL. **Compassion in World Farming**, 20 Lavant Street, Petersfield, Hampshire GU32 3EW. **Greenpeace**, Greenpeace House, Canonbury Villas, London N1 2PN. **Parents for Safe Food**, Britannia House, 1-11 Glenthorne Road, Hammersmith, London W6 0LF. **Finnrage**, Box 38 LOP, 52 Call Lane, Leeds, LS1 6DT.

US: **Committee for Responsible Genetics**, 186A South Street, Boston, MA 02 111. **Union of Concerned Scientists**, 26 Church Street, Cambridge MA 02238. **Rural Advancement Fund International**, PO Box 655, Pittsboro, North Carolina 27312. **Economic Trends**, 1130, 17th Street, NW, Suite 630, Washington DC 20036.

INTERNATIONAL: **Genetic Resources Action International**, Apartado 23398, E-08080, Barcelona, Spain. **Rural Advancement Fund International**, Wipplinger Str 32, A-1010 Vienna, Austria. **African Centre for Technology Studies**, PO Box 69313, Nairobi, Kenya. **Dag Hammarskjöld Foundation**, Dag Hammarskjöld Centre, Övre Slottsgatan 2, S-752 20 Uppsala, Sweden.

Worth reading on ... BIOTECHNOLOGY

The Laws of Life, Development Dialogue 1-2, (Dag Hammarskjöld Foundation, Uppsala, 1988). Excellent wide-ranging introduction to the key issues in biotechnology. *The Bio-Revolution Conucopia or Pandora's Box?* (eds) Peter Wheale and Ruth McNally, (Pluto Press, 1990). A lively debate about the pros and cons of genetic engineering. *The Gene Hunters Biotechnology and the Scramble for Seeds*, Calestous Juma, (Zed Books Ltd, 1989). Thorough account of how biotech is affecting the Third World. *The Baby Machine* (ed) Jocelynn A Scutt (Green Print 1990). Well-written critical look at reproductive technology. *Genethics – The Ethics of Engineering Life*, David Suzuki and Peter Knudtson, (Unwin Paperbacks, 1990). Thought-provoking and readable analysis.

HEALTH

Polio

Quiet conquest

POLIO is on the way out. It now looks if the ambitious target of immunizing 80 per cent of the developing world's children by the end of 1990 has been reached.

'As a result of a decade-long effort, the lives of over 12 million children have been saved and more than 1.5 million cases of paralytic polio have been prevented', says UNICEF. The final figures, which become available this month, should provide the evidence.

When the 80-per-cent target was first set by the World Health Organization just over 10 years ago, only 15 to 20 per cent of the children in the developing world were being immunized. More than five million were dying every year from common diseases like measles, tetanus and whooping cough, and half a million children were being crippled each year by polio.

Today, the toll has been halved. Two and a half million children have been saved by vaccines this year, but two and a half million have still died from diseases which vaccines can prevent. 'Eighty per cent immunization does not mean an 80 per cent reduction in deaths, because disease is both more common, and more commonly fatal, among the minority who have not been reached,' says UNICEF



Polio could become a disease of the past by the year 2000.

in its latest State of the World's Children Report.

Now a new target has been set – to increase the overall immunization level to 90 per cent or more. 'These achieve-

ments,' according to UNICEF, 'are within the grasp of any nation which commits itself to them.'

At approximately \$10 per child for full immunization

(against polio, measles and tetanus) the total cost of reaching these targets would be approximately one billion dollars a year for the next 10 years. The developing world could be expected to continue to meet two-thirds of the bill, leaving a gap of \$300 to \$400 million a year to be made up by aid from the industrialized countries. The investment would soon pay for itself. The eradication of smallpox is now saving more than one billion dollars a year in vaccine and surveillance costs – three times as much as it cost to eradicate the disease.

In most countries there are two major opportunities for rapid improvement. If unvaccinated children who are brought to clinics for other reasons were either vaccinated on the spot or referred for immunization, then most countries would soon reach the 90 per cent target. Similarly the target would be reached if all children brought for a first vaccination were to complete the full course. Drop-out rates between first and third injections are often as high as 50 per cent.

Following the eradication of smallpox in the late 1970s, polio is likely to be the next major disease to be eliminated from the face of the earth. The Americas and Europe should be free of the crippling disease by 1995 and the rest of the world by the year 2000.

The State of the World's Children 1991/ UNICEF.

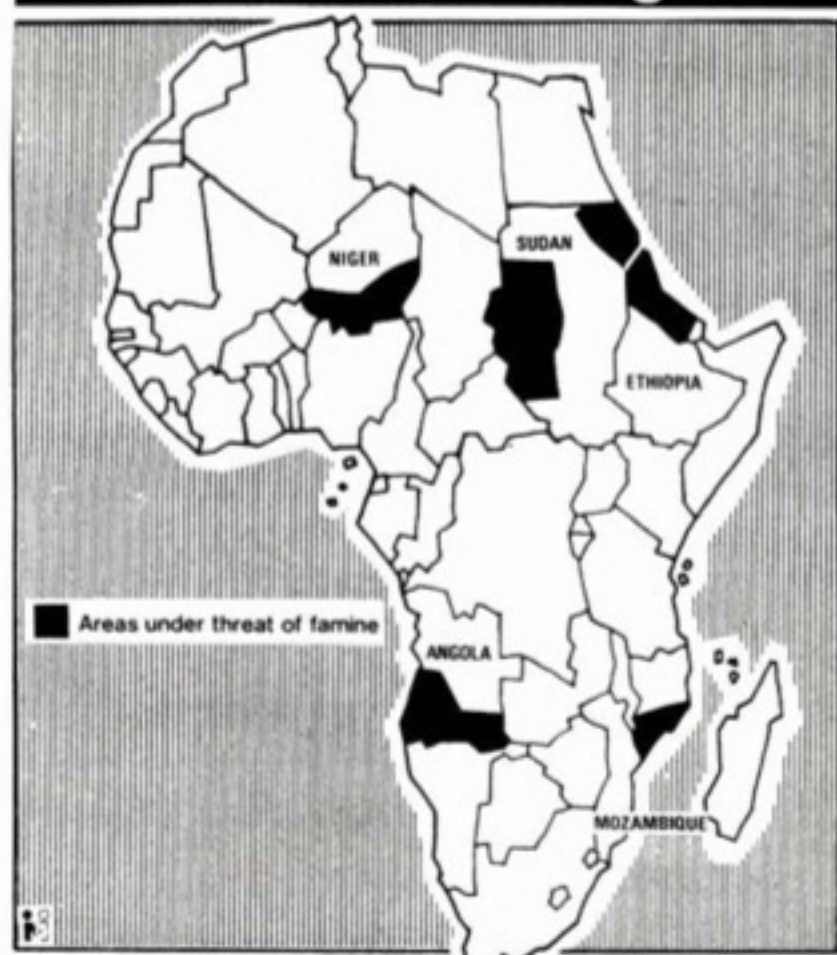
AFRICA

Feast

Famine for Africa

FOR the first time in four years, the world is producing more food than it consumes, thanks to a record cereal harvest

Famine hits Africa again



in 1990. Yet more than 10 million people are threatened by starvation in the Horn of Africa. What is going on? Well, it's the usual story. The food is in the developed North, the need is in conflict-ridden areas of the South. This time around the aid needed is on a larger scale even than six years ago when starving people haunted television screens around the world. But already there is talk of donor fatigue. And, in some cases, African governments themselves are reluctant to admit that there is famine and to receive foreign aid.

In Sudan, the combination of civil war between the Muslim north and the Christian south and drought wiped out almost the whole harvest of 1990 and now threatens eight million people with famine. But the military Government has only just

acknowledged that severe famine looms and is reluctant to turn to the West for help. Aid is getting through at a local level and most aid agencies are going ahead with their relief operations.

Drought has also hit Mozambique, suffering from a 15-year-old civil war. One million people have been displaced. Many are without medicine or salt and so are vulnerable to easily preventable diseases such as measles and diarrhoea, which can be as lethal as starvation. Levels of chronic malnutrition are reaching 20-50 per cent in children under five. An end to the civil war would not provide a solution. It would bring back nearly a million refugees, now living mostly in Malawi, and increase the number of people facing starvation.

In southern Angola two mil-

lion people are on the verge of famine. UN reserves are in imminent danger of running out and the donor response has been extremely poor. Drought has also struck Niger and according to the FAO one to two million people are at risk.

However, in war-torn northern Ethiopia and Eritrea the warring Government in Addis Ababa and the Eritrean independence movement are for the first time cooperating to distribute food aid equally.

Peace is, of course, the long term solution: even though Burkina Faso is more prone to drought than Mozambique, it has neither famine nor fighting. For immediate relief food aid is the only answer, however.

Jules Van Os (additional facts from Jeremy Harding and Ogen John Kevin Aliro) / Gemini

NICARAGUA

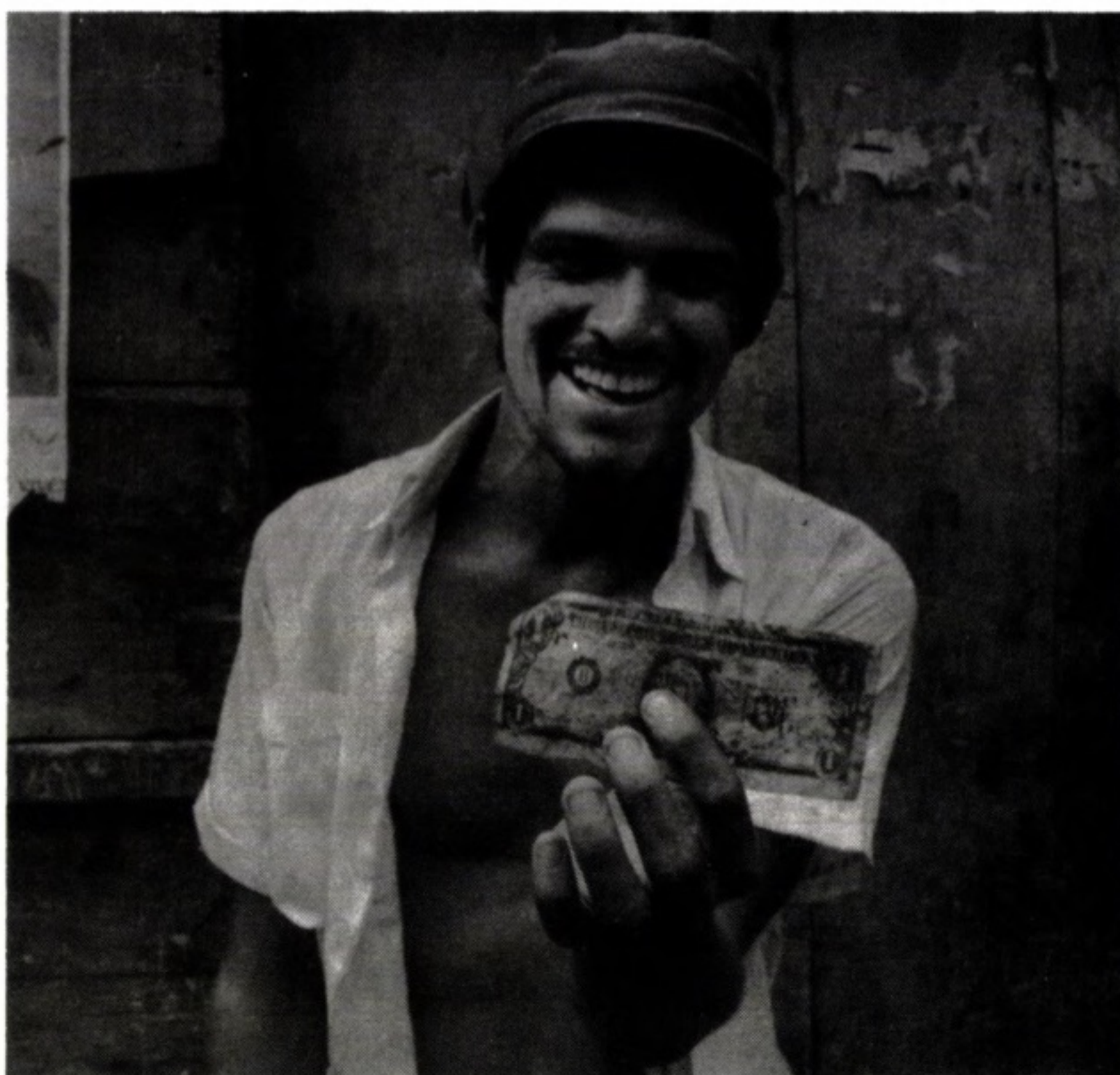
Chaos

The cost of compromise

It is now one year since the ruling Sandinista party (FSLN) in Nicaragua unexpectedly lost the election to the National Opposition Union (UNO) and war-weary Daniel Ortega gave over the President's seat to right-winger Violeta Chamorro.

The two key electoral concerns were the Contra war and the crippled economy. The FSLN hoped that if it won a fair election the US Government would be compelled to accept the result, to cease funding the Contras and to lift its economic blockade on Nicaragua. The desired outcome: an end to the war and an open door to economic recovery.

This was not to be. The Bush administration not only backed Contra rebels through 'humanitarian aid' right up to the election. It also tailored its statements to persuade Nicaraguan voters that only a UNO victory would guarantee an end to US funding for the Contras, the lifting of the trade embargo and a renewal of aid. Voting for 'the US's friends' was thus perceived by many as the



High hopes, low deal. The US cheats on friendship bought cheap.

only hope of escaping poverty and ending war.

Today the country faces economic chaos with unemployment at 40 per cent and inflation running at 3,200 per cent a year. The Contras have not given up their arms – instead they have been demanding even greater concessions. Armed ex-Contras, desperate for land, have been grabbing it from the agricultural cooperatives formed by the Sandinista revolution. There has

been a 40 per cent shortfall in the first harvest and famine seems imminent. And the US has not delivered on the aid package.

Violeta Chamorro has discovered that UNO (which means one) is by no means united but consists of politicians with widely differing views. When it took power the Chamorro Government decided to impose a free-market economy, cutting public expenditure, privatizing state land and industry, putting a

credit squeeze on all sectors not producing for export and introducing a new currency pegged to the US dollar. Hand in hand with this went the desire to restrict labour rights and weaken trade unions. Their actions were often unconstitutional.

The country convulsed in two national strikes, the threat of civil war hovering like a storm cloud. This led to a national dialogue or *concertacion* in the hope of reaching a consensus on future economic policy. The Government had to abandon its radical economic plans.

This hasn't found favour with the US, which wants to see a swift destruction of the FSLN and its economic model. There are also strong indications that the US has withheld and delayed aid so as to pressurise Chamorro into greater confrontation with the FSLN. The US also wants Nicaragua to drop its \$17 million suit against it in the International Court of Justice for damage caused by US-financing of the Contras for over a decade.

When elections were held last year the whole world turned up to see if they would be fair. Now that the new Government is perched upon an economic catastrophe, where is everybody?

**Based upon the CIIR Update:
Nicaragua: After the 1990 Elections**

Photo: Larry Towell

IMPERIALISM

Puppets

TV-show bullies rebuffed

In an abandoned lumberyard, almost bare of props but littered with what looks like throw-away furniture, a world-class children's television programme is created.



Kiko and Pong: getting up the noses of greedy Western media goons.

The Filipino show Batibot, a home-grown version of the American puppet series Sesame Street, began seven years ago. Its mainstays are a turtle puppet called Pong Pagong and a chattering monkey called Kiko Matsing – counterparts of Big Bird and Kermit the Frog. Last June it ran away in Munich with the top prize in the Prix Jeunesse International, the Oscar equivalent

for children's programmes.

The Munich euphoria was short-lived. In September producer Lydia Benitez-Brown received a terse letter from the Children's Television Workshop (CTW) in New York, creators of Sesame Street, asking her to 'cease and desist' using Pong and Kiko. The two had been loaned to Batipot for use without any formal agreement.

Benitez-Brown and her small staff are fighting back. They are asking Filipino children to collect a million signatures so they can keep the show going. Benitez-Brown hopes to send the signatures to President George Bush.

Batipot began as a co-production with CTW in 1983. Pong and Kiko were created with their help, though CTW did not like the result because it thought the turtle too clumsy. But the turtle and monkey were part of Filipino folklore written by national hero Joe Rizal. Pong and Kiko, made of rattan and foam, are a huge hit with the very young.

Benitez-Brown claims that Batibot is not Sesame Street but a separate Philippine production made after its contract with CTW expired. The show has no funds, no government subsidy and gets a few scattered grants. It costs only \$2000 an episode to produce against Sesame Street's \$200,000.

Batibot has been recycled to keep it going. New material is inserted into old tapes to be viewed repeatedly by Filipino children. Benitez-Brown says CTW reacted when it found out she was negotiating with an Indonesian private channel to produce a Bahasa version of Batibot.

She adds: 'the objective of Sesame Street is education. We have never veered away from that. We have never commercialized Pong and Kiko to sell any product. The simple truth is that we cannot afford to give them back. Pong and Kiko really mean something to the children. They are not Ronald MacDonald.'

Abby Tan/Gemini

BRAZIL

Mendes murderers

Two men were sentenced in December 1990 to 19 years in prison for the death of Chico Mendes two years ago in Brazil. Mendes was the leader of the rubber tappers union in the small Amazonian state of Acre. He became internationally famous when he mobilised fellow tappers in an attempt to stop the destruction of the rain-forest by cattle ranchers.

After a trial lasting four days a cattle rancher, Darly Alves da Silva, was convicted of ordering the murder of Mendes. His son had confessed to carrying out the murder on the first day of the trial.

Nevertheless further death threats against rubber tappers continue. The present leader of the union in Acre, Osmarino Amancio Rodrigues, has said that the ranchers continue to destroy the forest and menace those who oppose them. He himself has received dozens of death threats, claiming that 50 activists have been murdered since Mendes was killed and that the real culprits – much more powerful landowners – are still on the loose.

From New Scientist, No 1748/1749 1990

FOOD

Renaissance and the hamburger

Residents of Florence are horrified to hear that McDonalds' burger chain are planning to set up a 240-seat fast-food joint in a thirteenth century Medici palazzo. Furthermore it is sited

only 30 metres from the famous Cathedral. They might have been more disgusted to learn that the building itself has the same proprietor as that of the Cathedral – the Opera del Duomo.

From Agscene No 101, 1990.

TOBACCO

Wheezers win in Brazil

Some of the strongest regulations for the control of tobacco advertizing yet planned in Latin America, have been sabotaged by British American Tobacco (BAT) and Philip Morris tobacco companies. Drawn up by the Brazilian Ministry of Health, the rules prohibited the distribution of free cigarette samples, prohibited smoking in hospitals and other health-care institutions, required a warning label covering 20 per cent of tobacco product packaging and banned TV commercials between six am and nine pm.

The Brazilian Cigarette Industry Association, a trade



group including BAT (which controls 70 per cent of the nation's cigarette market) and Philip Morris (which has a 15 per cent market share), lobbied aggressively to weaken the regulations. They put together a powerful advertising programme aimed both at the general public and at the President – Fernando Collor de Mello, pleading that no other government regulations were as stringent and that cigarette adverts do not make people take up smoking.

Revised and diluted regulations now allow the promotion of smoking on TV as long as there is a four-second health warning. Free samples can also continue to be distributed, except in hospitals and schools.

From Multinational Monitor, Vol 11, No 9, 1990

GLOBAL WARMING

Aussie sheep slaughter

Australian sheep ranchers are slaughtering herds that are not even worth the bullets that killed them. With sheep prices as low as five cents a head, the market has collapsed. The country supplies 70 per cent of the wool for the world's clothing and demand has nosedived.

The superpower confrontation in the colder climes has declined, meaning large amounts of wool used for army clothing are no longer needed. Other theories maintain that global warming has reduced the demand for wool clothing. To cap it all, the Gulf crisis has effectively stopped Australia's sheep trade with the Arab nations.

From World Press Review, Vol 37/No 12, 1990

BUREAUCRACY

Civil service sloth

'We receive callers only after 11 am' is the sign in many government offices in Benin. According to the local newspaper, people are tired of the bureaucratic sloth in a country where the Government is the major employer. If anyone turns up at 9 am requiring service, they are likely to find the offices empty. Even at 11 am they are usually vacant. Only by 7 pm can one find the place buzzing, for then everyone is there earning overtime.

From World Press Review, Vol 37/No 12, 1990

INDONESIA

Poll disaster

An opinion poll in the Indonesian weekly, *Monitor* (circulation 700,000) asked readers to vote on who was their most popular and respected person. Indonesia's President Suharto came first. Various other figures including Iraq's President Saddam Hussein scored well. However the Prophet Muhammad only scored 11th.

The poll was published in the 15 October edition. By 23 October the weekly was banned. This followed days of protests and rioting, including the wrecking of the *Monitor* offices, by incensed Moslems. Issuing the ban the Minister of Information, who himself owns 16 per cent of the publication's shares and ranked ninth in the personality poll, said the *Monitor* had 'incited unrest'.

From Far Eastern Economic Review, 15.11.90.

CONSUMERISM

Boycott news

The following are some of the boycotts which are running at the moment. Apologies to NI readers in Canada, Australia, Aotearoa (NZ) and the US for only listing British action groups. However, these groups will be happy to give you more information including your national group if you are interested in knowing more about the issue.

South African produce and Shell. Despite the negotiations within South Africa, the ANC and Anti-Apartheid are still calling for sanctions. Contact: Anti-Apartheid, 13 Mandela Street, London NW6 4TA.

Colombian bananas. This is because of the violent suppression of human rights in the Colombian banana industry. Brands which may originate from Colombia include Banacol, Dole, Chiquita, Del Monte and Fyffes. Contact: Colombia

Solidarity Committee, Priory House, Kingsgate, London NW6 4TA.

Israeli produce. This is against the illegal occupation of the Gaza Strip and the West Bank. Contact: Palestinian Solidarity Committee, BMPSA, London WC1N 3XX.

L'Oréal. It is the biggest cosmetics company in the world and continues to test products on animals. Contact: Animal Aid, 7 Castle Street, Tonbridge, Kent, TN9 1BH.

Nestlé. The company is boycotted for the irresponsible marketing of infant formula

baby milk in the Third World. Contact: Baby Milk Action, Regent Terrace, Cambridge CB2 1AA.

Peat and peat products. Serious environmental damage is done by peat extraction. Contact: Friends of the Earth Peat Campaign, 26-28 Underwood Street, London N1 7JQ.

Philip Morris/Marlboro. This company sponsors Senator Jesse Helms in the US, a campaigner against AIDS research. Contact ACT-UP, 67-69 Cowcross Street, London EC1.

From The Ethical Consumer, Issue 11, 1991.

Omalluk's new baby

Why do Inuit women give away their own babies – and adopt others? Jane Henriques tried to understand the heart-warming – and heart-breaking – custom while she was staying with an Inuit community on the tiny Arctic island of Kingnait.

It was dark when we made for home. Children were playing ice-hockey in the streets – as they often do – late into the night. Others tobogganed on seal-skins down their favourite slope. We came to the house of Omalluk, an accomplished carver. Jeanie, my Inuit host and guide, took me in to meet the family.

Two adults and eight children – four of them adopted – lived in the small wood-frame house. Several children were playing a video game on the mattress in the bedroom and two men were engaged in a game of cribbage at the table. A baby, meanwhile, was chewing contentedly on its seal-bone teether. 'This is Omalluk's new baby!' said Jeanie. 'She's adopted from me. Hello, beautiful eyes!'

Louisa, aged five and also adopted, was walking her doll in her *amautiq* – a scaled-down version of the traditional mother's garment with room for the baby in the back and a wide hood that can be pulled up over both mother and baby's heads. Omalluk's 18-year-old adopted son was finishing his own carving. In this community almost half the adults – about 200 people – are soapstone carvers or graphic artists who sell their work to the south.

As Jeanie played with the baby girl I was becoming increasingly curious about adoption. Virtually every adult I met had both adopted children and given their own babies away. One of my interpreters Elisapee, now 28, had lost her first baby, kept the second, given away the third, kept the fourth, given away the fifth and kept the sixth. Now her mother had asked her to have another one to give to her. 'I probably will,' she said.

Neetani, 47, had 10 children. Three died, one committed suicide, one was adopted. She ended up raising three of her own and four adopted children.

'What is this all about?' I asked.

'It can be about compassion for a couple who can't have a baby or have any more babies,' explained Jeanie.

'Or in order to name a child after a relative who has died,' added Omalluk.

'Or,' said Jeanie, 'if a couple has babies who keep dying they may give away the next one and adopt somebody else's. There are also lots of teenagers who choose not to go on the pill because they smoke. They normally give their babies to their mothers or to relatives.'

I started to compile a list as I met more people in the community. One mother had adopted a son when she was single 'because all my friends had babies'. Some women even adopted babies when they themselves were pregnant, and then gave their own baby away at birth.

But I also discovered some of the unexpressed pain that adoption can cause. One of Jeanie's sisters, Okpik, aged 42, told me how her parents-in-law had arranged for her third child to go to an infertile couple. 'As soon as an adoption is arranged all emotions for the baby you're carrying are set aside,' she said. 'But I was stuck in hospital in Iqaluit for a few days after the baby was born and I had to work hard not to get attached to it. There is no pressure on anyone to give up a baby... but the wishes of the elders are always respected.'

'I had no choice,' said Neetani, speaking of the hardships endured by women. 'I did not know until the baby was born that my mother and in-laws had agreed to another couple adopting it.'

One young father felt bitterly about having to give their first child – a daughter – to his mother-in-law. 'But I would have been thrown out of the family if I had taken any action against it,' he said. His wife, now the mother of two more young children, described coming back from Iqaluit with the baby. 'As I walked off the plane my mother took the baby out of my arms without even looking at me, and walked away with her.'

'Did you cry?', I asked.

'Yes, I cried a lot – but only on the inside – I didn't want my mother to know.'

There were two accounts, however, that confirmed my growing feeling that there was some wider principle underlying adoption. A couple from another community adopted Letia's baby. 'Now they bring the child back to visit,' she said, 'and I feel very close to the family.' Akalayuk had three adopted children, followed by two of her own, and gave the second away. 'Adoption brings families much closer together,' she said.

Perhaps adoption had originated as a survival strategy. In a land where death made frequent visits and lay in wait for those who made mistakes, children were valuable commodities. Inuit-style adoption would have ensured that all families raised as many children as they were able, but that none raised more than they could reasonably manage. The bonds created by adoptions may have been a guarantee of help in times of need, of shared food during periods of starvation or at least a means of ensuring that some of your children had a chance of survival if you and your close family died prematurely. Old habits died hard.

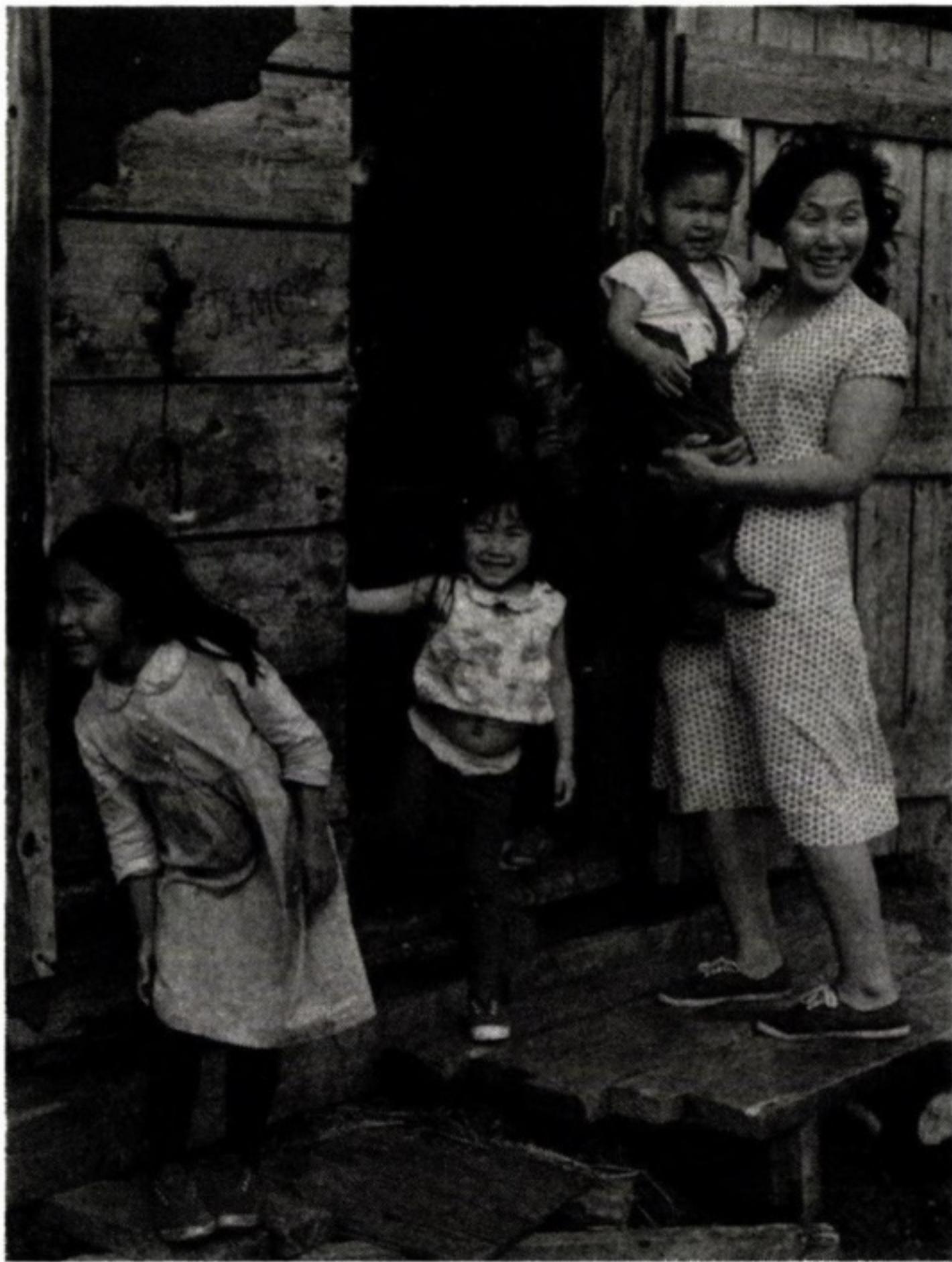
Social workers pointed out to me some of the disadvantages of the system, however. When grandparents who have adopted teenagers die the children they leave sometimes become delinquent, their natural parents having little interest in them. I heard several reports of 'slave children' – usually orphans – who are used as servants by adopting families.

Most of the children I met, however, were affectionate and seemed happy and well cared for, regardless of whether they were living with their natural or adoptive parents.

As far as the Canadian Government is concerned, though, Inuit 'custom adoption' should be conducted through 'proper legal channels'. The Inuit are currently fighting legislation which would take control away from the parents. Some adopting parents may take out legal papers in case a natural parent should want a child returned, but most would resist attempts to interfere. They at least know where their babies go and can maintain a relationship with them if they wish.

'Not like you!' Jeanie remarked. 'You never see your children again!'

Writer and anthropologist Jane Henriques has been making a study of the women of the Arctic.



Summer is fine, but adoption bonds may be a life-line in winter.



The naked and the disappeared: Tito Haas, hero of *Secret Wedding*.



Secret Wedding

directed by Alejandro Agresti

Buenos Aires' at dawn. A man running naked through the streets is picked up by the police. Back at the station he is identified as Fermín García (Tito Haas), a revolutionary who 'disappeared' under the military dictatorship in 1976. But Fermín remembers nothing of the intervening years. Set free and armed with a new name, he wanders bewildered until the memory of his old love Tota (Mirtha Bushnelli) spurs him to return to his home village to find her. But her faithful 13-year wait for him has made Tota 'crazy' – she does not recognize him. He decides to wait and attempt to win her love in his new identity. But the corrupt priest and influential powers who terrorize the village have been checking up on the 'Communist heretic'...

Agresti creates a moving allegory of Argentina's recent history through a sensitive, delicately balanced love story. While his vision is bleak and uncompromising – history repeats itself and people prefer to forget past horrors – his light comic touch and sense of irony prevent *Secret Wedding* ever becoming merely the servant of an idea. The tragic figure of Tota – betrayed time and again, yet partly to blame as she remembers without remembering – seems an embodiment of both Argentina's hope and its agony. You're never sure whether she recognizes Fermín or not – and perhaps she's right not to believe her eyes because the *desaparecidos* never do come back.

A bonus is that the film's only concession to the Latin American straitjacket of magical realism is a set of identical triplets.

Politics ★★★★★
Entertainment ★★★★★

Havana

directed by Sydney Pollack

A laconic American abroad who doesn't want to get involved in other people's wars meets up with a beautiful woman whose husband's a big name in the Fight for Freedom; that's a dusty old plot going all the way back to *Casablanca*. *Havana* surreptitiously updates it to the Cuba of 1958. The revolutionary overthrow of the Batista dictatorship is only days away and Jack Weil (Robert Redford) is a professional gambler on his way to what he hopes is the biggest card game of his life. However his simple philosophy of making money and enjoying himself is called into question when he falls in love with Bobby Duran (Lena Olin), the wife of a prominent member of Castro's rebel movement.

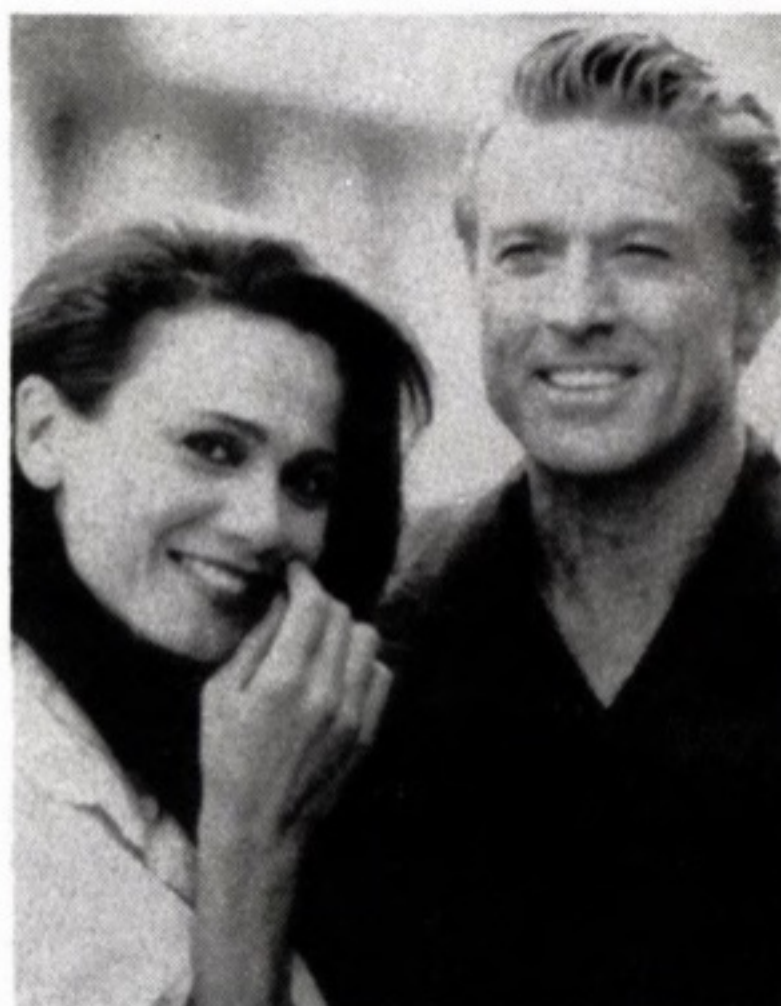
A long (two and a half hours) and very expensive-looking film, *Havana* impressively recreates the gaudy neon-and-chrome excesses of what used to be the Caribbean Las Vegas and isn't at all afraid to point out the links between the CIA, American organized crime and the Batista regime. But like so many other Hollywood films it transforms the issue of US foreign policy into a specifically individual crisis of conscience in which the hero's personal redemption completely overshadows the real issue.

Weil is an American and the US is propping up Batista but Weil is also a noble soul with his heart in the right place.

Thus, like *Platoon*, *Salvador*, *Air America* and so many others, the film is able to have its cake and eat it: bad Americans cause the problems but good Americans solve them while the local population simply provide a violent, picturesque backdrop.

The film makes much of the contrast between the hedonism of Weil's lifestyle and the murderous activities of the Batista security forces but never goes beyond the juxtaposition of partying rich folks and bodies being dumped in alleyways. At the same time it tends to overdose on fashion and nostalgia: Frank Sinatra and Dean Martin contribute to the bulging soundtrack while Redford progresses through a good half-dozen smart outfits. Redford never quite succeeds in conjuring Humphrey Bogart's aura of deep-thinking romantic isolation while Pollack's direction plods through an all-too-obvious script.

One further point of comparison with *Casablanca* is inter-



Olin and Redford: all too obvious

esting though: the wartime movie ends famously with Bogart's Rick abandoning his isolationist stance and declaring a commitment to the Allied cause. By contrast, as with the recent glut of Vietnam films, the moral of *Havana* is that the best policy for the US is to get out, go home and learn from the experience. In that line of pessimism at least, it hits the mark.

Politics ★★
Entertainment ★★

Enough For Me

Enough for me to die on her earth
be buried in her
to melt and vanish into her soil
then sprout forth as a flower
played with by a child from my country
Enough for me to remain
in my country's embrace
to be in her close as a handful of dust
a sprig of grass
a flower.

From *A Mountainous Journey*, autobiography of Fadwa Tuqan, Palestine's outstanding woman poet, published by The Women's Press UK.



Abuse of Power

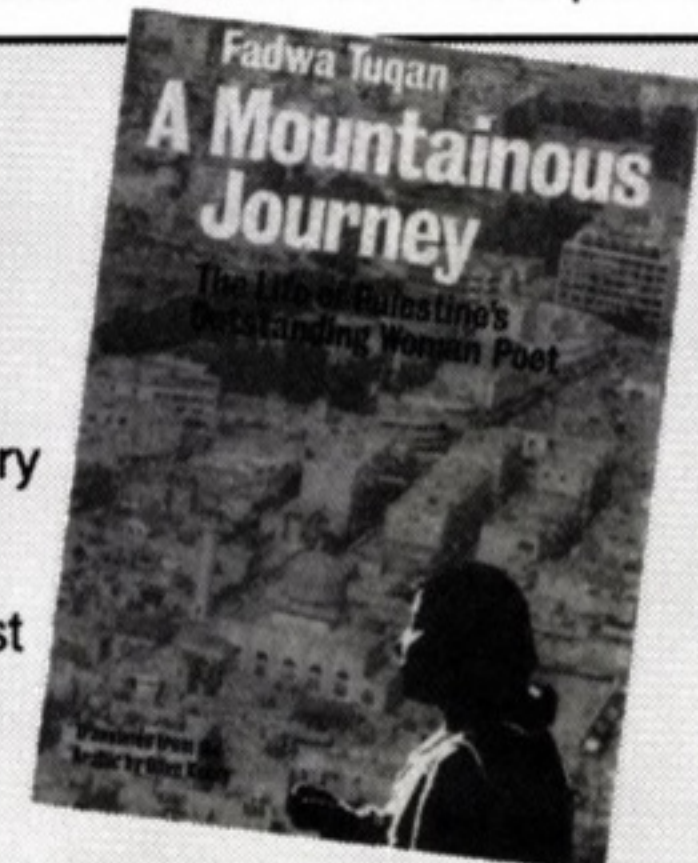
by David Dembo, Ward Morehouse and Lucinda Wykle (New Horizons US)

In 1962 an advertisement appeared in the *National Geographic* showing a giant hand pouring clear fluid from a beaker onto a field. The land was being ploughed by an Indian farmer guiding two oxen. In the background loomed a modern petrochemical complex. 'A hand in things to come,' read Union Carbide's caption. You can say that again.

Days before the publication of this critical look at Union Carbide, the chemical giant distributed a statement to its shareholders. The firm denounced the book as 'biased', proclaiming that they led in safety and environmental matters. The company responsible for the deaths of some 10,000 poor Indians at Bhopal warned its shareholders that the authors were seeking 'to impute evil to our free world economic system'.

In fact *Abuse of Power* is concerned with accountability and democracy. The managers of modern multinationals are self-elected and self-perpetuating. The authors ask whether the workers, communities and nations where these private firms operate shouldn't have some say over how they operate.

This is a timely book. And not just because Bhopal focussed the world's attention on multinationals whose Third World operations seldom have the same safety and environmental standards as at home. But also because the democratic victories in Eastern Europe have led to a renewed chorus equating freedom and democracy with the unfettered rights of private business to operate as it sees fit. *Abuse of Power's* examination of the social perfor-



mance of one of the world's largest chemical companies reveals a sordid record of disregard for the health of the environment, of employees and of people living close to its plants.

The list is long, Bhopal being only the most obvious example. In Puerto Rico the company was found to be fouling the environment both inside and outside a graphite electrode plant it had located in a poor barrio. Even at home in West Virginia's Kanawaha Valley, rates for leukemia, lung and endocrine cancers are among the highest in the US.

The authors propose that the social performance of multinationals be judged by standards similar to those the international community uses to evaluate the human-rights records of governments. It seems a modest enough proposal but will doubtless be regarded as radical heresy as much by the managers of our world as by the managers of Union Carbide itself.

Politics ☆☆☆☆
Entertainment ☆☆☆

MUSIC

Round the Outside: The World Famous Supreme Team Show

presented by Malcolm McLaren (Virgin)

Malcolm McLaren: once godfather to the Sex Pistols, since then a world expert in the transatlantic recycling of ideas and fashions. He's often been criticized for exploitation of other cultures in his insatiable search for fame and this album – feeding unimaginatively on the talent and power of Latin Californian hip hop – will only add fuel to that fire.

McLaren has elected to zoom in on a mixed bag of rappers, DJs and singers from LA and NYC, choosing for his familiar cross-cultural fertilization process to revert to the

classical influences of the opera and old worn-out Shakespearean favourites. The result is unashamedly derivative.

Il Be Or Not Il Be is rapped with a notable lack of inspiration by MC Hamlet. *Opera House!* ('you're from the ghetto, I sing librettos') flatters to deceive – Sparky D's explorative house beat and Mona Lisa Young's haunting operatic vocals seem to be building up to something big. But they never get there: all impetus is lost and they tail off with a disappointed whimper.

There is one track worthy of your attention. *Un Coche De Agua Negra* is adapted from a poem by Federico Garcia Lorca. Here for once the rap style, house beat and operatic backing vocals actually fit Lorca's lines and the effect is gloriously imaginative.

But for the rest there is no cohesion, no heart. One approach after another is tried, halfheartedly pursued and then abandoned. McLaren is accomplished in creaming off what is popularly digestible from a wide variety of cultural sources. But



here his approach seems indiscriminate, masking only a dearth of originality. And when the plundering of an original source seems like an insult to it rather than a tribute, then the project is difficult to justify – whether morally or musically.

Politics ☆
Entertainment ☆☆☆

★ STAR RATING

Excellent	☆☆☆☆☆
Very good	☆☆☆☆
Good	☆☆☆
Fair	☆☆
Poor	☆

Reviews editor: Chris Brazier

CLASSIC

Simone Weil

... being the writer that speaks to the 1990s from the 1930s

SIMONE Weil has become a touchstone for me. For that reason I find this hard to write: it feels like trying to advertize sunshine.

Simone Weil died in London in 1943 while working for the Free French Provisional Government. She was 34. She died from discouragement and exhaustion, her health ruined by factory work; she would not eat more than the rations permitted to her compatriots at home.

Her death illuminates the way she lived – without the split between ideals and practice which allows most of us middle-class radicals to remain privileged all our lives. With her, thinking and being were one. She transmuted what she learned in the factories into analysis not conceived in libraries. Works like *Analysis of Oppression*, *Prerequisite to Dignity of Labour* and *The Needs of the Soul* addressed human beings directly and explicitly as ends in themselves; and by doing so Weil highlighted how unorthodox this is in our Western intellectual tradition. In most socio-political analysis we proceed from an economic and/or utopian vision of the 'Great Good' and therefore unconsciously use people as the means to realizing an abstractly conceived ideal.

In a letter to a friend written during her factory work, Weil wrote: 'When I think that none of the great Bolshevik leaders... had ever set foot inside a factory, so that they hadn't the faintest idea of the real conditions which make servitude of freedom for the workers – well, politics appears to me a sinister farce'.

In Simone Weil's political vocabulary, the concept of obligations supplants the usual Western concept of rights as the moral foundation on which all else is built. Such obligations are both material and spiritual. 'The cry "Why has somebody else got more than I have?" refers to rights. We must... do all that is possible to hush it... Minds capable of solving problems of this kind can be formed in a law school. But the cry "Why am I being hurt?" raises quite different problems, for which the spirit of truth, justice and love is indispensable.'

One of Weil's last works, her *Draft for a Statement of Human Obligations*, was published in August 1943 by the Free French Movement. It opens with a 'Profession of Faith' which begins: 'There is a reality outside the world... outside space and time... Corresponding to this reality, at the centre of the human heart, is the longing for an absolute good, a longing which is... never appeased by

any object in this world... Whoever recognizes that reality... holds every human being without any exception as something sacred to which he is bound to show respect.'

From the basis she has established, Weil goes on doggedly to list 'the needs in this world of the souls and bodies of human beings... For each need there is a corresponding obligation.' The needs of the body are obvious enough, things like food, warmth, sleep and fresh air. The needs of the soul sound much less familiar and are listed in contrasting pairs, which include 'equality and hierarchy, consented obedience and liberty, truth and freedom of expression, solitude/privacy and social life, personal and collective property, security and risk'.

In connection with 'security', Weil describes the need for 'natural human environments' – places where our language is spoken, and so on. 'Everything which has the effect of uprooting a man or preventing him from becoming rooted is criminal.' Groups like Survival International and the lobbying indigenous peoples of the Americas and Australasia are gradually making us Westerners aware of this truth we have disregarded for so long.

Simone Weil wrote about the things what we are only now finally being brought to see, helped by recent world-changing political events, and sadly also by the looming threat of global self-destruction. She came to adulthood in the 1930s, the first decade of all-out ideological warfare, but she was not deceived. In 1936 (aged 27), while her radical peers were spouting Marx, she was not afraid to write, in a piece called *The Power of Words*, 'No two nations are more similar in structure than Germany and Russia, each... pretending to see the other as the Beast of the Apocalypse... The anti-fascist position is this: anything rather than fascism; anything, including fascism, so long as it is labelled communism. And the anti-communist position: anything rather than communism...'

In the same piece she wrote 'What a country calls its vital economic interests are not the things which enable its citizens to live but the things which enable it to make war; petrol is much more likely than wheat to be a cause of international conflict'.

Fifty years on, now that our ideologies are collapsing, perhaps we are ready to learn from what Simone Weil was saying and doing while her 'brilliant' contemporaries (including Simone de Beauvoir and Jean-Paul Sartre) were dutifully toeing the Soviet line. As for her own brilliance, Weil had this to say: 'The eulogies of my intelligence are positively intended to evade the question: "Is what she says true?"'

Yvonne Burgess

Simone Weil: An Anthology edited by Sian Miles

Bolivia



Photo: International Labour Office



Leader President Jaime Paz Zamora

Economy GNP per capita \$570 (US \$19,840)

Monetary unit: Boliviano

Oil and natural gas are now main export earners, replacing tin. Others are timber, soya and coffee. Coca leaf and cocaine paste are most profitable exports but earnings circulate outside formal channels.

Main imports are capital goods and consumer products. Almost half the workforce are peasant farmers who produce two thirds of the nation's food despite lack of credits and technical support. Urban employment is mainly in the service sector, family workshops and informal sector.

People 7.1 million

Health Infant mortality 105 per 1,000 live births (US 10 per 1,000)

Culture Independent from Spain in 1825. Some 65 per cent of the population belong to the Aymara and Quechua peoples, 2.5 per cent to lowland ethnic groups; 5 per cent are of European origin.

Religion: Officially Roman Catholic, though cult and local religions predominate in rural areas.

Languages: Official language: Spanish. About half the population are bilingual, with Aymara or Quechua as their mother tongue.

Sources: Bolivia's National Population Council (CONAPO); UNICEF: State of the World's Children 1991; Bolivia's Central Bank.

Last profiled in March 1980

'PROGRESS' has been slow to reach Bolivia, South America's least developed country. Social needs have generally been last on the agenda in a nation built on the exploitation of cheap, unskilled labour to extract raw materials for Northern markets. From colonial times, silver, rubber, cotton, tin and oil have each taken a turn at monopolizing production.

Since the 1960s, yet another commodity has been in demand from the North: the coca leaf, staple of highland farmers, ancestral element in ritual and healing. As with previous 'booms', most of the profits end up outside the country. Coca fields have become the battleground in the anti-drug war waged from Washington, and the Bush administration has conditioned economic aid to the coca eradication crusade.

Aside from coups and cocaine, Bolivia has a more positive claim to fame. Social organization is a national trait; almost everyone belongs to some local, labour or community group, and the COB – the

central trades union congress – continues to unite workers from all sectors.

For 40 years, mining workers were the backbone of the labour movement. But in 1985 the collapse of the international tin market, coupled with the application of harsh monetarist policies, resulted in mine closures and thousands of job cuts. Coca growers, teachers and street traders are now key groups within the COB, whose strength has steadily declined under the New Economic Policy.

The New Economic Policy has been hailed as a minor miracle. Several years of stability are no mean feat in a country only recently emerging from a series of corrupt military dictatorships and inflation rates nearing 25,000 per cent.

Since the mid-1980s, two successive right-wing governments have overturned the State-oriented model installed after the 1952 popular revolution. They have swept away workers' rights, frozen the public sector minimum wage, freed controls on prices and imports and imposed job cuts. Protests are repressed. Foreign debt payments and military spending take priority over the people's needs, and apparent economic recovery is achieved at the cost of a disastrously unhealthy population.

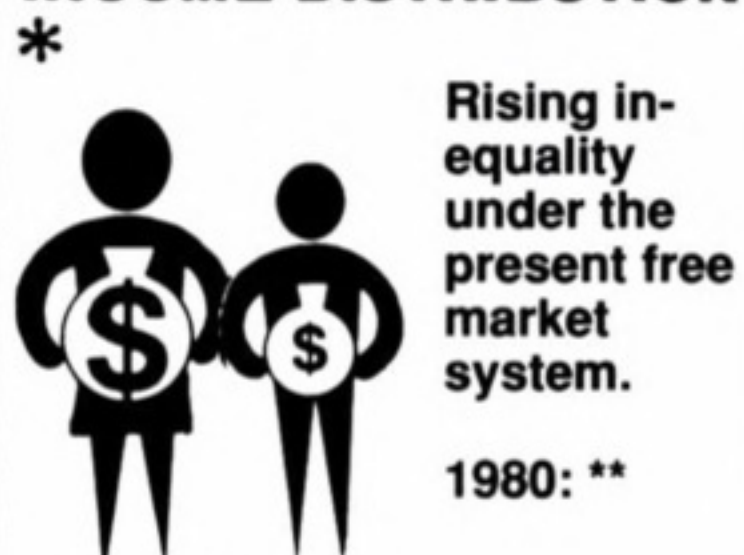
While the wealthy cruise the downtown avenues in air-conditioned Range Rovers, Quechua peasants beg in bank doorways and street kids shine shoes, pick through rubbish tips or hawk cocaine-based cigarettes in the parks. The markets are bursting with contraband goods from Chile, Brazil and Argentina, but few can afford to buy them. Many of today's informal workers were once companions in the unions, but solidarity is out of place when you have to compete for scant trade with the next stall-keeper.

Susanna Rance

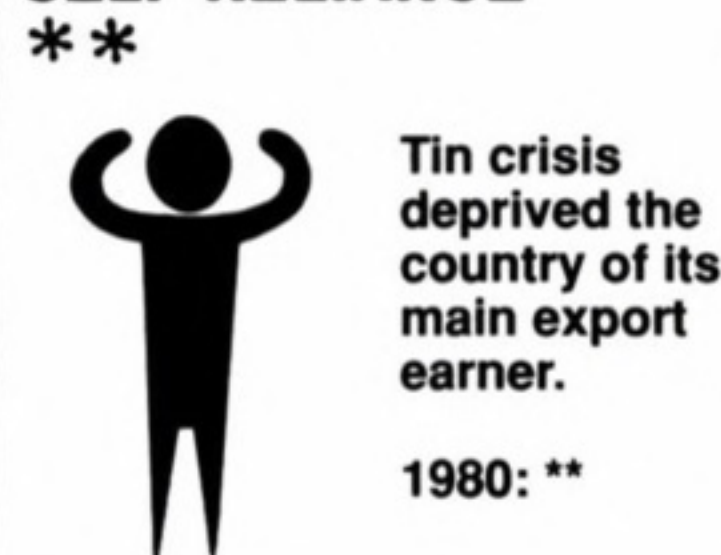
At a glance



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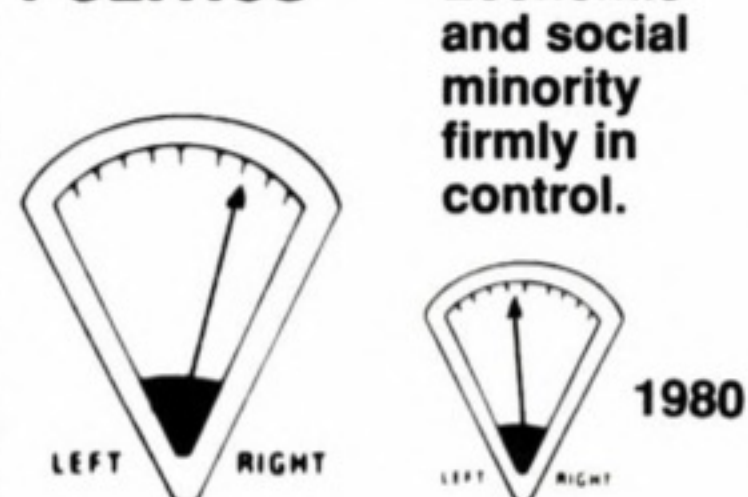
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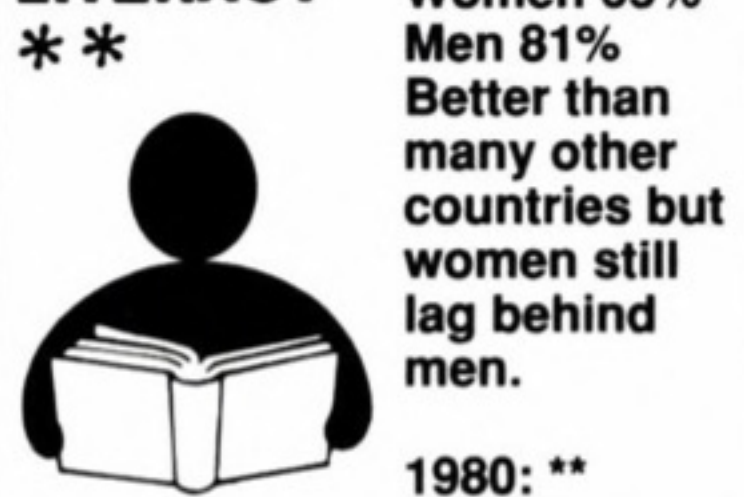
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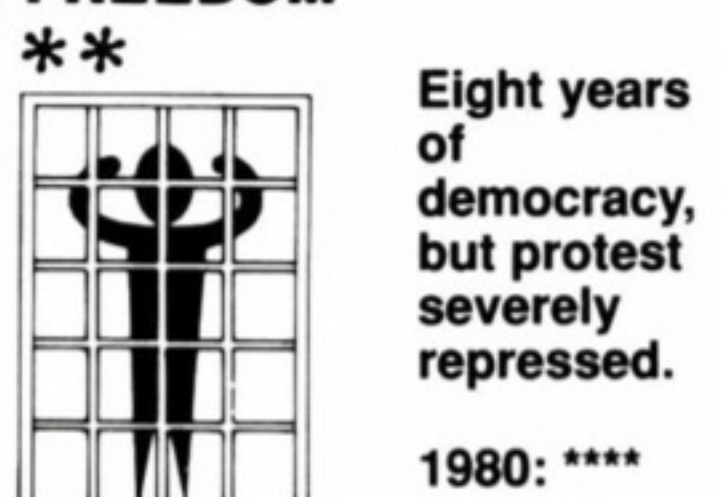
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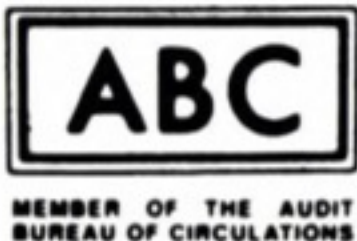
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Perhaps one of the most interesting examples of an authentically American, Third World project in the 19th century was the Paraguayan government of Carlos Antonio López in the mid-1800s. As early as 1820, (and this is unique in Latin America) illiteracy was extinct in Paraguay, a country where the Guarani language today continues to use the Guarani alphabet. Trade in wood, tobacco, yerba mate and sugar was state-run. Crops had been diversified and livestock was raised on government ranches. The public railway was expanding. This project, though authoritarian, was egalitarian and

While indigenous and traditional food production practices use about half a calorie of food, the fossil fuel-based mechanized and chemical agriculture uses 10 calories of that same calorie of food.

Some 1.2 million of Bangladesh's six million residents are slum-dwellers. Alongside its high-rise buildings are shanty towns that run along the contaminated shores of the Bay of Bengal. In Addis Ababa, a shocking 85 percent of residents live in what the United Nations call 'informal settlements'. In Uganda, the figure is 70 percent; in Dar es Salaam, 60 percent; in Bogotá, 58 percent; and in Ankara, 51 percent.

Bombay is India's wealthiest city, a hub of manufacturing, printing, banking and trade, as well as headquarters for the country's western elite. But half of its 11 million sleeping on the streets. In 1985, one-fourth, or about 680 million, of Asia's 2.8 billion people were living in urban communities. By the year 2000, the urban population in the region is expected to reach 1.4 billion; 60 percent (or six out of 10) will be squatters and slum-dwellers.

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Botswana

Population: 1,285,000
Area: 581,730 sq.km
Capital: Gaborone

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A testimonial from the North:

'The Third World Guide provides detailed information on all countries and a committed Latin American perspective on virtually every Third World issue. As a reference book it is indispensable for all concerned with North-South relations.'

Willy Brandt.
(former Chancellor, West Germany)

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'It contains the naked portrait of reality.'

Eduardo Galeano.
(author, Open Veins of Latin America)